ASSOCIATION OF AMERICAN MEDICAL COLLEGES

PROCEEDINGS OF THE TWENTY-FIFTH ANNUAL MEETING, HELD AT CHICAGO, FEBRUARY 17, 1915

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THE MEDICAL CAREER*

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The student who contemplates at this time a course leading to the practice of medicine has much to ponder.

The day of the apprentice is over; the pabulum projected for the ingestion of the student now and in the near future is more than the mental capacity of the ordinary student and it promises to tax the better ones.

The writers on medicine to-day deal in terms which are foreign to the student of two decades past and every year new terms creep in needing classification even for contemporary students. The revolution has come with the concept of the microscopic field and its interpretation and the alignment of the many phases of scientific medicine has not yet come about. There is still much disorder.

The history of medicine is full of genius sparking in the field of nebulous uncertainty and clearing a way to scientific development. At times modern concepts have been anticipated. Barely a century has been needed to develop the microscope and its possibilities; less than half a century has made the invisible world of microbic organisms an open book with a well-nigh accurate familiarity with the habits and purposes of a large group of these bodies.

Literature has amassed volumes of research and facts have accumulated so fast that they are still not altogether coordinated.

Speculation has given way to specific knowledge in the cause, treatment and prevention of ancient diseases, to the end that these most potent enemies of mankind have one by one yielded to the measures derived from the laboratory, until only a few are left.

The purposes of the medical profession have changed. Even though the cupping basin still hangs in out-of-the-way places as the emblem of the barber's erstwhile practice, the progress in medical and surgical procedure has moved on into higher and broader planes.

The early mysticism of the chemical laboratory has gone forever and the symbolism of combined elements has developed a usefulness which reaches into almost every field of modern medicine. The formulae of bacteriologic invasion mimic the organic compounds, and in the symbiotic processes, the chemistry of

* President's Address.

nature expresses itself in new combinations. Physiologic functions proceed by chemical changes, and the very pathogenetic function of disease may be defined in chemical terms. The ions of newer concept make for finer appreciation of natural changes in tissues, and as the higher processes of structural development or degeneration occur, split products of chemical interpretation bear their part.

The anatomist has a new viewpoint in the study of tissue, and as the central nervous system, the ductless glands, including the marvelous pituitary with its power of balance, open up more and more the secrets of their functions, our knowledge of the human economy and its possibilities will change.

The analysis of disease in Fothergill's day was based on gross evidences, determined by observation and the deductions warranted by experience. To-day the blood picture and the culture tube save time in the reach for a diagnosis, and the man who is not trained to either misses the definite determination of his case.

Therapy is no longer based on empiric practice, though drugs still survive. Antagonistic similars are potent in overcoming zymotic types of disease and in preventing some of them. Vaccines and sera have grown into daily use and so wide a range have they covered in their polyvalent function that there is a possibility of reducing all such to a small code of practice.

The development of civilization has brought about new diseases or new types of old diseases, and old diseases have laid lines for variations several times removed from the prototypes, and in these, multifarious opinions and investigations have arisen and will arise.

The purviews of medical practice have extended beyond the mere care of the sick. The state has created new fields of activity in contemplating sanitation and regulations in public health, requiring more and more expert training to satisfy the needs of the newer function.

The food supplies, the disease index, the eleemosynary institutions and even the proletariat fall within the practice of the state's solicitous concern.

Not only hospital care of the sick has obtained through the interest of the state, but even care of those sick in their own domiciles has been considered as falling under the obligation of the state in some places.

The limitations of the state policy and power along these lines are not to be measured just now — time alone may tell. The gradually increased and increasing power of the health board, however, argues that the possibilities of usefulness of the state are great and that they may be much more far reaching than at present.

In the United States we have been engaged several years in debating standards of medical education. From the agitation have evolved more or less certain opinions, fixing desirable conditions under which graduates in medicine should be qualified to engage in the practice of the profession. Curricula have been weighed and measured to fit the case and more or less arbitrary entrance requirements have been agreed upon, with reservations as to a possible adjustment when the accepted regulations have been tried out. Much of the reform has been necessary and the results have proved this, for undesirable medical colleges have expired and more worthy colleges have reformed. Everywhere new standards prevail and medical education has moved to a higher plane.

In methods of teaching and in equipment all colleges have materially improved, and a newer concept of medical education has come about. The scientific development of all of the component departments of the schedule has necessitated better teachers, with special training in many branches needing more attention.

The result is now evident. The college course is so crowded with work that the allotted time is not sufficient to satisfy the various departments in their projected instruction. More time will soon be needed.

Those who are engaged in regulating the standards of medical education are not yet certain of the plan nor of the scope of the required education necessary to qualify the intending practitioner in medicine.

All have been willing to concede the cultural advantage of previous college training, and in the end-results the student who has finished a college course with an accredited degree will derive most from his medical course; as his college course has been more or less, he will proportionally profit; but are we altogether satisfying our obligations in making standards for the exceptional instead of for the average student?

In most of the discussion of the regulations and standards, the viewpoint usually paramount has been the demand for better and higher training; the student has not often been discussed.

Formerly the practice of medicine was largely vocational, the reasons of the student engaging in the study of medicine being varied, but, for the most part, through an inspiration to follow a calling because of its traditions. The practice of medicine has never suffered from that class of students. In the net results of the graduates in medicine, about 40 per cent. quit within a few years after leaving the medical school.

It was possible to acquire the preparation for practice in three to four years, and it often happened that a man gained a medical

education after he was mature in worldly experience, being thus able to satisfy a delayed ambition.

To-day the requirements in medical education make these things impossible.

The intending medical student hereafter will more than ever weigh the question of his calling, because of the conditions confronting him. More than ever he must have an inherent and earnest proclivity, for no one of the professional careers open to a young man offers a harder road, attended with greater outlay in time and in money, than that of the study of medicine. His prior preparation is more exacting than in law or in engineering and his actual curriculum is more taxing; even when he is through, the examining boards will likely soon require a hospital year, and if he is properly cautious he will want more experience before he accepts the responsibility of his profession.

The expenditure of almost half an expected lifetime in preparation for a career should warrant a return worth while.

What may the student expect?

For a livelihood, the practice of medicine brings in slow return, depending on location and opportunity. Success is laggard as a rule, and even when emoluments balance expenditures the profit in the practice of medicine is not considerable. The exceptional physician may grow well to do through fortunate investment, but outside of the larger cities few get rich.

For scientific interest the field in medicine is large, and the reward comes in achievement, but the compensation otherwise is negligible. Problems of all sorts develop for the laboratory man as well as for the clinician in medicine and their solution is worth while, but not profitable.

The lines of least resistance have appeared to be in the specialties, where larger fees may be demanded and where more or less ignorance may be disguised in technic.

The intending medical student should know these things and he should be told things. Too often the pack blindly follows a lead, and only when it is too late the young man realizes that he has spent himself for nothing.

The phases of a medical career are many, and only some of them have been touched here, and the subject has been chosen and has been discussed with one prime object, which shall be considered in the conclusion of this address — What is our obligation as educators and what are we doing to make the medical career worth while?

The review of the published announcements of most medical schools discloses the fact that the contents aim solely at indicating the requirements made of the student before he begins the medical course and submits the demands to be made upon him while he

is so engaged. At no place is there any discussion of what he may expect thereafter.

In old-time essays or texts on medicine there was rather full discussion of the opportunities as well as the hardships to be expected, and even while the field of medicine was barely covered, its limitations were defined. Medieval medicine was a mixture of practice and of ethics, and even John of Gaddesden may have been a better doctor because he took time to learn theology too. Our medical student is run through a mold in common with his fellows, and only when he later on grows into a larger usefulness does he begin to know his subject.

During the past ten years there has been agitation enough, even unrest, with the result that the ideal medical course has been sought by all honest schools. The direct effect has been a marked increase in the cost of medical education, not only to the student, but to the medical school itself; efficiency has been purchased at an expenditure in budgets entirely out of proportion to the income derived from students. Some state institutions have met the demand by sufficient appropriations to cover the greatly increased cost of medical education, but other states and more institutions have been put to careful financing to come out with even small deficits.

The student is already aware of these things and has weighed the prospect of a more expensive medical course from now on.

Efficiency is after all the chief purpose in medical education, so far as training the student is concerned. To this end faculty provisions take care of the more erudite or better-trained teachers and the number of teachers on the staff make for a better training of the student.

But when the student has satisfied the required courses, has he had the best medical education we can offer him? Is he qualified as a physician?

In summing up the deficiencies in medical education in the United States a few years ago, methods here were compared with those abroad, and to our disadvantage.

Yet, from time to time, considerable American criticism has arisen because in many foreign countries the course in medicine requires all of six years. Our best schools concentrate in four, and, in revising the system, plan a hospital year and more of early preparation to make up the discrepancies.

The examination of any student body at any part of the present accepted curriculum finds most of the students rather half baked, and with a corollary complaint from most of the teachers that courses are not long enough to give the student necessary instruction.

The branches related to the so-called special subjects are either neglected or discounted and the medical graduate is put through

on a limited schedule, with the suggestion that he may take up the special subjects after he is graduated; in other words, he may make his education as a doctor complete *after* he has become a doctor.

In a few schools the lack of sufficient scope in the so-called special subjects is compensated by an elective fourth year, in which the individual student may stress a particular field, making other subjects more or less minor.

We are really at that point in medical education where the student and his training should be reconsidered. Our present plan is too much inclined to make of the present graduate a predestined specialist, dissatisfied with the prospect of the drudgery attaching to a general practice. This is already evident in the overcrowding of the profession in the larger cities, the gravitation of young men who find no content in country practice.

Our curriculum should be broadened so as to finish the preparation of the student for general practice, with enough training in special branches to permit the care of ordinary cases and to prevent the common confession of most physicians that "I know nothing about the diseases of the eye, or of the skin, etc.," reflecting seriously on their qualification as physicians.

The abandonment of the field of general practice has been a natural outcome of a deficient general training, and the deficiency has resulted from an obvious lack of time in the schedule provided in a four-year course.

Whatever adjustment comes about should be weighed well and the point of view of the one most interested, the student himself, should enter largely.

The medical career should be more a desirable choice now than at any other time in the history of medicine, but the argument of opportunity alone should not be sufficient; there must be a future consideration of the element of reward and of compensation, to make the career worth while.

THE CLASSIFICATION OF MEDICAL SCHOOLS

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The desire to classify seems to be a universal human motive. In education, in politics, in society, men reach out for some form of classification that shall be definite and specific, so that every cause may have its right label, every party its true name, and every institution be included in its proper class.

Institutions as they develop become more complex, and hence more difficult to divide into classes. These difficulties increase as one seeks to take into account intellectual and moral qualities. For this reason it has been almost impossible to classify colleges. It would be easy enough, indeed, to separate colleges into groups according to some simple condition, for example, those having more than five hundred students, or more than a million dollars endowment, or those teaching Hebrew; but such groupings would have little significance. The moment one takes into account intellectual qualities and educational facilities, the groups fade into each other by imperceptible gradations so as to wipe out the lines of demarcation.

The classification of medical schools does not present quite the same difficulties. There are certain criteria that may be applied to them, or, indeed, to technical and professional schools of any sort, which are more definite and easier to appraise than is the case with colleges.

Before any suggestions can be offered, it is necessary to present some review of the work of the Council on Medical Education of the American Medical Association, which has for some years been engaged in just this effort. Moreover, it has achieved notable results in the improvement of medical education in the United States. It has done more than any other agency could have done to weed out unfit medical schools, encourage full-time professors in the scientific branches, to demand bedside clinical teaching and insist upon adequate laboratory and hospital facilities.

This the Council has been able to do not only on account of the hard work of its president and members, but also because it represents the medical profession in America. Over half the practitioners of the country are members of the local medical societies. These choose delegates to the state societies, and the latter in turn choose the House of Delegates, a body of approxi-

mately one hundred and fifty. The Council on Medical Education is a committee of this body, and its action has all the weight of the entire medical profession. Universities, colleges and state boards have accepted the decisions of the Council as the expression of the thought of the leaders of the profession in America.

Under these conditions the reorganization of medical teaching has advanced very rapidly, and the classifications of the Council have now become sufficiently differentiated to make some examination of the present situation desirable to all interested in medicine and in medical education.

As a layman in medicine I venture to make such a review because the Council is primarily a council on education, not on medicine. It is in effect a national agency in education, and its work touches the secondary school, the college, the university, no less directly than the medical school. It has dealt quite as much with the education which precedes the medical school as with that given in it. It is impossible, indeed, to legislate on medical education without becoming immediately involved in the entire educational problem.

From the standpoint of education I have not found myself in agreement with all of the work the Council has done, admirable as it is. For example, I cannot make myself believe that to begin three sciences and a modern language in one year will make toward sound education and training. I am sure that this recommendation will in the end be only a step toward a more wholesome effort to present medical candidates who are at the same time fairly educated and who are grounded in the elements of these sciences.

For similar reasons I look upon the enforcement of this provision over the whole United States as premature. In the South the medical schools were barely upon the high school basis and I fear the effect of this action both upon medical school and high school. It will, I fear, work to continue for some years a series of insincere adjustments and the progress made in the raising of standards, while attractive on paper, is likely to be in part illusory.

One feature of this effort for which the Council is not responsible is the submedical school teaching elementary science and modern languages. For these parasites on our educational system there is no excuse.

If the colleges are not doing rightly the work of premedical education the remedy is to turn back unprepared students to them and to see that their work is well done. The remedy does not lie in having the medical school take over the work of the college. The real purpose of these schools is to get students. To be consistent the medical school which goes into this effort should add a preparatory school as well. The intake could be larger. One can forgive in a measure the resort to this device in the case of a

detached medical school, living on fees and with starvation ahead as a result of the new entrance conditions, but for a university to maintain, in addition to its own schools, such an extramural device for catching students seems unworthy of a university.

These questions while directly related to the educational work of the Council are, however, aside from the subject of this paper. I turn now to the matter of classification.

To classify medical colleges certain criteria must be assumed. The Council grades medical schools upon a scale of 1,000, using ten criteria, each having a weight of 100.

The criteria which the Council has chosen are the following:

1. Showing of graduates before state boards and other evidences of the training received.

2. Enforcement of a satisfactory preliminary educational requirement, granting of advanced standing, and the character of records.

3. Character of curriculum, grading of course, length of session, time allowed for matriculation and supervision.

4. Medical school buildings; light, heat, ventilation, cleanliness.

5. Laboratory facilities and instruction.

6. Dispensary facilities and instruction.

7. Hospital facilities and instruction, maternity work, autopsies, specialties.

8. Faculty, number and quality of trained teachers, full-time instructors and assistants, especially of the laboratory branches, organization and extent of research work.

9. Extent to which the school is conducted for properly teaching the science of medicine rather than for the profit of the faculty directly or indirectly.

10. Possession and use made of libraries, museums, charts, stereopticons, etc.

In order to make use of definite objective criteria in estimating a medical school, these tests must have two merits:

1. They must constitute true tests of the qualities of the school.

2. They must be capable of practical application in the hands of competent judges.

It seems to me that these ten criteria leave much to be desired both in respect to significance and practicability. Nor can they be considered comparable one with another in importance.

The showing of graduates before state boards, for example, is a test easily and definitely applied, but it is one which will vary with each state, and with the character and strictness of the examinations. Nor can it be compared in importance with good laboratories and good hospital facilities. It is a fact that in some

states a candidate could, by a good use of cram books provided by a diligent faculty pass with flying colors through the state board examinations, although he would be helpless in the presence of a patient.

A very interesting proposition was once made to the Carnegie Foundation by a young college man out of a job, who offered for a certain money consideration to pass with credit the state board examination in a given state without ever attending a clinic or knowing anything about medical practice. The proposition was not accepted, but it had interesting possibilities.

Criterion 2, as adopted by the Council, is definite, fundamental and capable of practical application. It says in effect that one test of a medical school is the qualifications of the candidates it accepts. The practical test of this is a reasonable entrance requirement, honestly and sincerely enforced. To ascertain the validity of this test, however, it is necessary to carry out an inspection of these entrance requirements and their enforcement by men thoroughly familiar with the work of colleges and high schools.

Similar difficulties are evident in other criteria; such, for example, as Number 9, which undertakes to estimate the percentage of commercial spirit in the medical school. Such a criterion is in the first place incapable of practical application. To mark a school 50 per cent. commercial and then average this up with other higher percentages would seem a sort of *reductio ad absurdum*. Such a school has no place among good schools at all.

Criterion 10, relating to the use of libraries, is somewhat indefinite. These have their use in stimulating the acquirement of a good working library, although it may be doubted whether a library acquired under such pressure would be used. In any case, it would be better to make the possession of a library a mark of good standing rather than to make its presence count in the same proportion as the possession of a competent faculty.

In general, it may be fairly said that these criteria are too many, are not comparable one with another and are not in all cases capable of practical application.

It is also fair to say that the application of such objective tests as these would require a staff of several experts. This would doubtless be true of any tests which could be devised. Thus the man who passes on entrance requirements ought to be an expert in education. He must know colleges and schools as only a teacher can know them. But such a man is quite unlikely to be qualified to pass on the pathological laboratory. Similarly the expert who can pass upon the laboratory might be quite unable to estimate the quality of the clinical teaching.

Let us now turn to the results of the classification of the Council. When it began its work there were some 160 schools;

to-day there are approximately 100, and this result speaks volumes for the work of the Council whether one agrees with all its decisions or not. No better service than this has been done by any group of men laboring for the cause of education.

The third classification, revised June 21, 1914, divides the 109 medical schools then existing in the United States into four classes. According to this grouping, there are twenty-nine first-class medical schools, thirty-eight second class, twenty-two third class and twenty fourth class schools. One acquainted with these schools has only to examine these classes, or, more properly speaking, these groups, in order to perceive that this classification has now become almost meaningless. For example, the first class, or group, includes not only the strong medical schools with large endowment, complete clinical facilities and research departments, like those of Harvard, Johns Hopkins, Columbia, Cornell, Washington University and others, but it takes in also institutions like Vanderbilt, Tulane and Texas, whose standards and facilities are of an entirely different order. To place these latter schools in the same class with the strongest in the country, and perhaps the strongest schools of the world, is good-natured prophecy, not educational justice.

But this is not all. Class "A Plus" has been stretched to include schools of the type of the College of Medicine at Omaha, and the Starling-Ohio School at Columbus, since known as the School of Medicine of the Ohio State University. To group these schools in the same class as Harvard, Johns Hopkins and Washington University is to wipe out real distinction.

The second class of schools, those grouped under Class "A," show similar discrepancies. It would be difficult to defend upon educational or medical grounds the wide variety of schools included under this group. Some of them are promising efforts under university direction, reaching toward good ideals and sound support. A considerable proportion are schools controlled by groups of practitioners and living entirely upon the fees of students. To raise the standard of the entrance requirements, as the Council has done, makes it impossible for any medical school to live from fees and do sincere medical teaching. One cannot go through this list without realizing that, however honestly and carefully it has been made, it contains an incongruous assortment of institutions which have no particular reason for being grouped into a class by themselves. One recognizes, further, that between the poorest third of the first class and the best third of the second class, there is no appreciable difference. Finally, it is clear that a strong current exists which will ultimately tend to carry all these schools into the Class "A Plus."

The succeeding classes (B and C) show similar incongruities. The schools differ from each other by imperceptible gradations,

and their differentiation into distinct classes rests upon distinctions which become every day more insecure. It shocks our sense of proportion to have Johns Hopkins classified with the Starling-Ohio, since become the colleague of a second school—a school of sectarian medicine—taken over by the same university. To class together such widely separated schools is likely to do harm rather than good. Some more permanent means of classification must be found if this classification is to endure.

Can medical schools, any more than colleges, be classified into sharply divided classes? This question lies at the root of the whole matter.

In reply, I would say that in my judgment no body is so well prepared to carry out such a work as a body which represents the medical profession. Reform in medical teaching, like all other reform which is genuine, will come from within, not from without. No other group of men, in my judgment, could hope to do what the Council on Medical Education has accomplished. I believe, as I have already said, that the Council has suffered in its work by a lack of touch with the educational conditions with which it has been dealing. It can, I believe, improve its future legislation by availing itself of a closer knowledge of schools and colleges; but I question whether any group of men, however qualified, can make a hard-and-fast classification of medical schools, which would not be open to serious criticism. In other words, the problem of classifying schools into four or five groups upon such criteria as the Council has assumed seems to me practically insoluble. It has served its day and some looser form of grouping seems now desirable.

In order to make an improvement in the present classification, one must go back to the criteria which are adopted for estimating a medical school. There are certain things about a medical school which are fundamental and yet definite and specific, and which may fairly be appraised by those who have the necessary knowledge and experience and who take the necessary time. The feasibility of any fruitful classification rests absolutely upon having criteria that shall be at once significant and capable of application. These are few in number. They seem to me to be embraced under the following heads:

1. The first test of any school, whether it be a school of general education or for a profession, is the quality of material which it accepts; or, to put in another way, the state of preparation at which it admits its students.

An entrance requirement reasonable and fair to the school system and honestly enforced, is one definite criterion for the judgment of any teaching institution. This criterion, however, is of value only when it is administered by men familiar with the school systems and the colleges.

2. It is not enough to receive into a medical school well-prepared candidates. Experience has shown that students received at the high school level develop into better practitioners of medicine than those who enter with a more advanced education, but are taught by teachers who are either incompetent or who have given only the fag ends of their time from practice. In other words, the quality of the teaching, the ability and devotion of the faculty, must be taken into account in estimating the fitness of a school of medicine for training physicians.

Furthermore, let us not forget in our zeal for research that the principal function of the medical school is the training of medical practitioners. To sacrifice their interests to the preparation of a few men for research is not to be thought of. Both ends can be attained by the use of a wise discretion.

These practitioners of the future enter the medical school as youths of 20 to 23. Their value to the body politic as physicians will depend as much on the character of their teachers as on their skill. I venture to say that every successful physician as he looks back toward the causes of his success will recall one or two of his medical teachers who helped him into the right path full as much by their human and moral qualities as by their professional skill. The value of a physician to any community is just about equal to his medical skill multiplied into his moral character. Therefore, above buildings, above state examinations, above even laboratories and hospitals I would place the character, and the ability of the faculty including the clinical professors, for they furnish the ideals of the young practitioner. It is the character of the teachers which determines whether the medical student fits himself for the business of medicine or the profession of medicine.

For another reason it seems to me desirable to lay at this time stress upon the matter of teaching. The student loses time both in high school and college by reason of lack of teaching skill on the part of his teachers, but there is no other teaching institution where the art of teaching is so little considered as in the medical school. A man is chosen because he is a good pathologist, a skillful anatomist, a well-known surgeon; but the question whether he can teach is seldom raised, nor is there any oversight in the medical school for improving the teaching or for the elimination of ineffective teachers. The good teacher comes by accident. Nowhere is there a greater chance to save time for the medical student than by improving the teaching in the medical school itself.

These two criteria — the basis of selection of the student body and the basis of selection of the teaching body — to my thinking outweigh all other considerations.

It is true that this estimate involves a wide exercise of personal judgment. To say what constitutes a good teacher is one of the most difficult tasks. Nevertheless, the quality of the

teaching is a fundamental fact in the school which cannot be escaped. Some judgment of it must be attempted, if any estimate of the school is to be made.

It is, in my opinion, far sounder educationally to place large weight upon the quality of the teaching rather than upon a specified curriculum. After all, we do not wish to make these medical schools absolutely alike. A certain elasticity of institutional development should be left. Courses of study will under any circumstances follow a general plan. Too sharp insistence upon the details of the courses would seem to make against their educational freedom, which is desirable. Besides these two criteria, whose determination involves the evaluation of certain educational and moral qualities, I would add three others which are definite, precise and which admit of accurate application.

3. The completeness and availability of the scientific laboratories in chemistry, anatomy, physiology, pathology and associated sciences form a definite and practical criterion for estimating the value of a medical school.

4. Similarly, the character of the clinical facilities, including both hospital and dispensary and the use which is made of them, form a concrete and a usable test of the character of the school.

5. These four qualities of a good school — soundly administered entrance requirements, an able and devoted faculty, complete scientific laboratories, modern clinical facilities both in the hospital and the dispensary — can only be obtained by the expenditure of money. Below a certain minimum of expense it cannot be honestly done. A school that pretends to do these things with a wholly inadequate income stands self-revealed. To provide them from the fees of students, under the conditions now accepted by medical schools, is impossible. In other words, a concise, detailed statement of the receipts and expenditures of the medical school throws a great light upon the relation of its professions to its performance. It affords the most practical means of showing how far performance keeps pace with promise. A prospective medical student who knew how much money was spent upon the departments of pathology, or internal medicine, or obstetrics, would get a better insight as to whether the medical school could carry out the promises of its catalogue than he could get from any other source. If he knew that the department of pathology was run on $1,800 a year — including the salary of the professor — he would know more about what sort of education he was likely to receive than could be gleaned from whole pages in the catalogues.

Perhaps there is no other one thing in which the medical schools, and particularly those which are on the border-line, are more tender than over the request to make an exhibit of their finances. The request to furnish this generally brings forth an

eloquent oration on the thesis that the work of a medical school must not be measured by the money put into it, that no one can reckon in dollars the devotion of the medical practitioners of the country, and that to place their service on a commercial basis is an insult to the profession. No one would depreciate the devotion and self sacrifice which American physicians and surgeons have put into medical schools. No one who knows anything about the subject, however, will fail to recognize that their presence on a medical faculty is in many cases a matter of business as well as of devotion. Any man who knows what the transformation of our medical schools means understands that the modern medical school cannot be maintained on the kind of teaching that sufficed for the medical school of ten or fifteen years ago. The time is here when the clinical professor must give not a mere fraction of his time to the medical school and the hospital, but this must constitute his primary work, to which his practice is secondary. Under these circumstances the medical school which professes to give a modern education with a totally inadequate income is offering to the student something which it cannot furnish; and the prospective student has a right to this sort of information.

I repeat, therefore, that an honest detailed statement of the receipts and expenditures of a medical school forms one of the most sure and just tests for judging the work of the school and the relation of its promise to its performance. Most medical schools prefer to be virtuous when they can afford it.

Assuming that these criteria are reasonable and practical, do they form a means for accurate classification? In other words, can some grouping of existing medical schools be made upon these criteria which will be educationally just, which would be helpful in the development of the schools themselves, and for medical education? For after all it is this last consideration which ought to govern our judgment. No classification is worth while unless it makes in the end for the betterment of medical education. And those who have watched the classifying process have been aware of a somewhat disquieting tendency among the medical schools to get into Class A or Class A Plus without much regard as to whether they were better places for education or not.

A hard and fast differentiation into four or five distinct classes is, I believe, almost impossible and its ultimate effect doubtful.

From such thought as I have given the matter, I am inclined to think that one in the possession of the information called for under these five heads could make some such grouping as the following:

There is a group of institutions of the highest class, which in respect to all these tests stand by themselves. They constitute a group apart and include those institutions of large resources and endowment, of high standards, and of large clinical facilities,

which are clearly able to offer the best modern education. No two persons qualified to judge will differ greatly concerning them.

It would also be feasible to designate a list at the bottom of the medical schools made up of institutions which are weak, which are involved in commercial medicine, which live only by flagrant evasion of all reasonable standards, and which ought not to be recommended to students. This group of institutions should be omitted altogether from any list to be recognized by the American Medical Association. To a certain extent a school considers itself recommended to the public even when it appears in Class C.

There would then remain a group of medical schools secondary to the strong and well-endowed schools, but which are able nevertheless to give a fair medical education along modern lines. They are the places to which a student would go knowing he might not get the best opportunities which the country afforded, but that he was receiving a decent modern education in medicine. Such a group would undoubtedly contain institutions of a wide variety of excellence, but great light would be thrown upon their relative standing by a publication of the details upon which the grouping was effected. Promotion should be made only when it had been clearly attained and the basis upon which it was accorded should be made public. In all these matters publicity is wholesome alike for the medical school and for the agency which seeks to appraise it in comparison with others. The indefiniteness of the Council's descriptions of these classes has been one great source of difficulty. To call a group of schools "satisfactory" is not enough. The grounds of the decision also ought to be made known. This means carefully chosen criteria, a body of three or four experts (not necessarily employed all the time, but in thorough cooperation), examinations of a detailed and careful nature and finally full publicity. I hope the Council which has so brilliantly done the work of the past ten years may have the means to undertake this sort of examination.

Let me say one word in conclusion in regard to such criticism as I have made of the Council on Medical Education. I have spoken concerning the work of the Council with great frankness for the reason that no other course is worth following, and in the belief that progress comes only by the frank and honest expression of opinion in regard to such matters. I have such high regard for the work of the Council, and for the work of its chairman, that I take a keen interest in the preservation and development of the Council's work — a work which seems to me likely to fall from its own weight if the classification proceeds along the present lines. I hope, as a layman in medicine, that it is not impertinent of me to discuss these matters, since they are primarily questions of education; and I hope also that it may be admitted that the sincerest service a friend can perform with

respect to the work of the Council is to speak in a critical, and yet in a friendly way, concerning those directions in which, it seems to him, the dangers lie. The interests of education in our nation are one. Education itself is one thing, from elementary school to university; and medical education in its largest and truest sense can be approached wisely only when one keeps this fact in view and regards medical education in its true perspective as a part of the whole problem of education of the American nation.

DISCUSSION

DR. N. P. COLWELL, Chicago: Since the beginning of its work, the Council on Medical Education has received all manner of criticism, and has long since learned to differentiate between that which was sincere and that which was not. There have been many criticisms, back of which the purpose was evident—that is, the individual interests of those making such criticisms. There is no question, however, of the sincerity of the criticism made to-day, and that sort of criticism the Council always welcomes. Nothing will help more in the advancement of education generally, and especially of medical education, than to allow all voices to be heard so that a consensus of opinion regarding all problems may be formed. For that reason we welcome heartily the paper that has just been read.

President Pritchett has expressed a doubt regarding the wisdom of the higher entrance standard in the South. We have been especially interested in the development of the high schools of that section of the country since it has been and is one of the most important problems confronting the medical schools of the South. The reasons why the Council believes the enforcement of the one year of college requirement in the South should not be delayed, are as follows: In the first place, the Council has fixed a standard for the entire country and has tried to obliterate any lines between the North and South, or the East and West. A second point is that the South, according to statements made year after year at these conferences, no longer desires to have special concessions made for it. The colleges of that section desire to be judged on the same basis as those of other parts of the country. Third, if the high schools of the South are imperfect, is it not all the more reason why those who are going to study medicine should be required to take the one year of extra work even though it may not be at first as perfect a college year as is desired?

Then, as to the requirement itself: Many educators throughout the South, college presidents, professors of secondary education, and others, have stated that the effect of the requirement one way or the other depends on the manner in which it is administered. In response to the question: "Would not the requirement of a year of college work, with the strict understanding that it be preceded by a four-year high school education, or its actual equivalent, help the high schools in the South?" the answers with only one exception, were decidedly in the affirmative. The chief difficulty found in the inspection of some of the universities in the South, as well as of the medical schools, has been the lack of efficient methods of administering their entrance

requirements. Such faulty methods are a positive hindrance to progress both of the high schools and of the colleges. If the medical schools verify every credential, and make sure that students admitted have the four-year high school education, before any college work taken may be counted as such, it would be a positive aid in the development of the high schools. Such requirement will induce the small colleges in the South to increase their entrance requirements to at least fourteen units of secondary school work, or not be recognized by the medical schools. All agencies practically agree that the one year requirement is a temporary measure, and that the preliminary sciences can better be completed in a two-year course.

Meanwhile, it is well known that rapid progress is now being made in the development of the high schools and colleges through the South. Through the work of the Southern Association of Colleges and Preparatory Schools, through the work of Miss Elizabeth Colton, and others, the colleges in that section are rapidly adopting the requirement of fourteen units of high school work for entrance, and it is only a matter of a few years when there will be little difficulty in the enforcement of the higher requirement for admission to medical schools.

All of you, doubtless, have followed more or less the work of classifying medical schools and remember the state of affairs existing before the work of standardization began. We fully concur in President Pritchett's statement that it is much more difficult to differentiate between high grade schools, but that difficulty was not so apparent ten years ago. On the other hand, when all medical schools become high grade it will not be necessary to classify them. The first inspection made by the Council during the winter of 1906-07 was a work never before accomplished. At that time, in a considerable number of colleges the inspection could easily be made in ten or fifteen minutes. At that time, there were no standards and no one knew what the average condition was. In the second inspection, however, we had the benefit of the knowledge gained from the first; we had a standard based on the average condition in all colleges of the country, although, as you may imagine, that average was far below the ideal, since the conditions of medical education throughout the country were so low. Following the second tour of inspection, however, on the basis of that national average all the medical colleges in all sections of the country were graded. The classification prepared in 1907 was not published. It was read, however, before this Conference, and each college was informed of its rating. It is largely to the credit of the physicians in control of the colleges, that improvements at once began, and that such remarkable results have been obtained. The progress had well set in before the classification of 1910, based on the second tour of inspection, was published. In that classification the medical schools were divided into three groups—A, acceptable, B, doubtful, and C, non-acceptable. It was impossible at that time to divide the colleges into two groups, of acceptable and non-acceptable, as suggested by President Pritchett. It was necessary to provide a third group for those which were doubtful. This intermediate group contained colleges which had good reason for existence and it was only right to give them a chance to make the changes needed to bring them into the first group.

As to the standard by which the colleges were measured, it was not one which could be used satisfactorily to differentiate between the highest grade colleges, but it met the needs of the time. Again, it is doubtful whether any one item in any standard could be given, on the basis of which, taken alone, medical schools could be fairly classified. One item of the Council's standard was the record of the examination of the graduates of the various medical colleges by the State Licensing Boards and such records were based on figures taken from official reports. Nevertheless, to have classified the colleges on that item alone, would have been misleading and inaccurate. For example, numerous instances could be given of low standard medical colleges which, by having all their graduates examined in a single state where the examinations were easy, obtained 100 per cent. of successes, while in the same year Johns Hopkins, and several other high grade medical schools which had graduates examined in many states had a few failures, giving them ratings of from 85 to 95 per cent. Again, no matter how detailed your standard of measurement may be, there is much that should be left to the judgment of an experienced inspector. On a previous occasion,[1] I referred to the requirement in a certain state, that the medical colleges possess a certain specified amount of equipment. On inspecting one of the medical schools in that state, I found they had purchased the apparatus required, and had a man who could describe every piece of it, but no one using it for teaching. So, after all, in addition to noting the possession of beautiful laboratories, of equipment, of libraries and of museums, the inspector must find out to what extent the college is making use of them in the instruction of medical students. Therefore, unless it is wisely administered, even the most elaborate and detailed standard of measurement would not result in a reliable classification of medical colleges.

President Pritchett thinks that the standard of measurement used is not ideal, and I am inclined to agree with him. It is the best we have, however, and has served its purpose admirably. Even if the same outline were followed, moreover, I do not believe any educational or inspecting agency could have done the work as effectively as has the Council on Medical Education. Why? Because of the abundance of information constantly being received at the headquarters of the American Medical Association, of which the Council is a permanent committee. As many of you know, the Association publishes a directory, and for that purpose obtains a lot of detailed information regarding the physicians of the country. From the medical colleges information is obtained regarding students and graduates. From the State Boards information is obtained regarding examinations showing what physicians have been licensed. In fact, the Council is conducting a clearing house of information in regard to medical education and medical licensure. We have files of catalogs of liberal arts colleges, of medical colleges, and an abundance of information bearing on the problems of education generally. A great deal of reliable information is thus available which cannot be obtained by the ordinary inspections. Having all that information, the Council is in better position, perhaps, to effectively carry on this work than any other agency.

1. "Need, Methods and Value of Medical College Inspection," Jour. A. M. A., Aug. 14, 1909, p. 514.

The strongest point in the Council's position is that it has no legal authority and has never claimed such authority. Its power comes from publicity, from telling the truth, so far as it has been enabled to know the truth. It is the power of publicity that is doing the work, not legal force.

The Council knows its ratings have been lenient. The statement has been repeatedly made, that if we have erred it has been on the side of leniency. Each succeeding classification, nevertheless, has been based on a better knowledge and has been drawn on stricter lines than its predecessor. The Council has endeavored to avoid extremes. On the one hand many have declared we were going too fast, while on the other hand some have criticized us for not going faster. The whole campaign has been constructive and the standards have been such as would lift up and not force out of existence any schools which deserved to exist.

As to our classification: It is true that certain schools were put into our A class which in a sense would not compare with highest and strongest institutions, such as Harvard and Johns Hopkins; nevertheless, according to the standard of measurement used, they deserved the ratings given them. The Council has not expected or attempted to bring all schools on as high a grade as Johns Hopkins or Harvard. The purpose has been to bring the medical schools in the lower classes up to at least the level of the lowest in Class A.

This paper by Dr. Pritchett is opportune and will be of service in the future work of the Council. The time has undoubtedly come when there should be a readjustment of standards, and perhaps new methods should be provided by which medical schools may be measured. Without question, in the next general reclassification of medical schools, a better and more reliable grouping should be made.

Dr. Arthur Dean Bevan, Chicago: I have very little to say. I find myself quite in sympathy with the position taken by President Pritchett on the subject of classification. I think we can regard all of these classifications as merely temporary expedients. We all hope that the time will come when we shall have no need of any rigid classification in this country. The classifications which have been presented by the Council have been these: We, first of all, made a classification of first, second and third class schools, based on results shown by the examinations of the graduates of different schools before State Boards. To be sure, this was a very crude thing. In that classification, Group 1, first list, contained all of the schools that had less than 10 per cent. of failures before State Boards. Group 2 contained those having between 10 and 20 per cent. of failures, and Group 3 all over 20 per cent. of failures. It was a very crude classification and yet was productive of a great deal of great good. When published and when the schools found that in this published list they were having 20 or 30 or 40 and perhaps 80 per cent. of failures of their students before State Boards, it meant a good deal and when this list showed as it often did that the graduates of certain schools always passed their own State Boards but when they came up before other State Boards they had a frightful mortality, that also meant something. That classification was employed but for a short time. Then the classification A, B, and C was introduced — acceptable, non-acceptable and doubtful schools,

based on a civil service examination of the school on ten points making a possible 100. That was carried on for a short time, and I think justified itself. Later the Class A+ was introduced for a specific purpose, namely, to mark the acceptable schools which, in addition to having the facilities for teaching medicine, required a year or more of pre-medical science for admission. That was the basis of A+ class. This year, inasmuch as 84 schools out of about 98 (the number is rather difficult to say—whether 96, 97, 98 or 100, because several schools are eliminating themselves within the next few months) now require this premedical preparation. The A+ group automatically eliminated itself.

We have discussed this matter pretty fully, and for the present it seemed that a working classification that might be effective and might secure results would be an A, B, and C classification, the A class being schools which were doing work of sufficient grade to warrant the Council in presenting them to the State Boards of the country with the statement that they were acceptable in the sense that their graduates should be entitled to come up for examination for licensure. The C group would consist of the non-acceptable schools. It is hoped that the State Boards will take that position, based on our own classification, and also, of course, on the evidence which they themselves can secure about these schools. The B group would consist of the doubtful schools.

It seemed to us that this classification may be productive within the next few years of a great deal of good.

I think we are all indebted to President Pritchett for presenting this matter in the way that he has, and, speaking simply as one member of the Council, I am sure that his analysis of the situation would be very helpful to the Council and to this entire movement.

DR. J. M. BALDY, Philadelphia: I have listened with more than considerable interest to Professor Pritchett's address because it has opened up in a very broad way the fundamental question of education of the coming medical man; a question with which we are all daily brought in contact and which at the present time is coming to be a burning one.

From our point of view, in my own home state, we have very definite fundamental principles on which we act and every action taken is based on the desire to reach a fixed point which we have in mind and which we have set as our goal. None of us have been what you might call educators in the sense in which Professor Pritchett speaks. None of us have lived in the realms of ideals and mysticism and pedagogism. Most of us are practical men and are working for a distinct end. We recognize two forces at work—educators and administrators—possibly equally important, but at the present moment we are inclined to the view that for the time being administration takes precedence.

President Pritchett has told us that we should have waited for the high schools of the South and should not have brought pressure to bear on them but should have exercised patience. We did wait. We have waited from time immemorial for the educators of the country to relieve us of that situation and after having exhausted our patience in waiting they come to us and again ask us to wait, wait, and again wait. O, Lord, how long? And the answer was a refusal to wait longer. What has been the result?

As administrators we did the only thing possible, cut loose from our medieval friends, the educators, and went after the results in our own way. And now the report from the South is that the high schools are on a four-year basis and could have been years ago had there been sufficient energy among educators. In three short years there has been accomplished what the educators were unable to accomplish in generations.

It is clear that the means is not pleasing to the educators. It would seem that rather than apply the means at hand these gentlemen would prefer to wait and continue to wait indefinitely, and this in spite of the assertion made yesterday by President Pritchett that both men and means were necessary and that without means men were wasted. The men were there, the means were lacking and yet the educators seemed satisfied to continue indefinitely to waste the energy and vital forces of the men because, forsooth, the method providing the means happened to jar on their sensitive souls.

Billy Sunday is in Philadelphia at present teaching those of us residing in the City of Brotherly Love the value of what he is pleased to call the "kick." With the backing of your Association, Mr. President, and the backing of this Council the "kick" was applied to the high school system of the South and it disappeared like a vapor before the wind. Can any one deny the result was worth the means?

President Pritchett complains again of the pre-medical year for the purpose of furnishing college grade sciences for the preliminaries of medical education and he issues a cry for help from the realms of mysticism and higher ideals, again in behalf of the educator, and asks that we do not take away from the colleges and universities that which has always belonged to them. I ask the question, have they the right to continue to hold that which they have abused in the past and are abusing in the present? Have they a right to plead that we again wait, wait, wait? Again I say O, Lord, how long?

We have asked these colleges to give us the means whereby our young men wishing to enter a medical life could be properly prepared for this study at such time as would enable them to be fitted to go out and earn their bread and butter at a reasonable time of life; at an age when they were still pliable. It is well known to us all that these same college educators will waste from one to four years of a young man's life and at the end of that time will not have given him that amount of science work which we as practical medical men know to be essential for the beginning of medical study.

We had a meeting of from fifteen to twenty college presidents in Pennsylvania and we put the proposition to them: will you give our boys in Pennsylvania the opportunity to get this scientific work preliminary to the active work of their coming lives? They argued the matter pro and con. Some of them thought maybe they could, others thought they could not and they finally decided they would not and they went home and did not. And then we said, we will make you; and the outcome was the pre-medical year. And why should we have respect for an institution and its ideals which are too medieval to reach out their hands to save themselves and their ideas? We wanted this preliminary education of the proper type and at a proper time and

as educators refused it we as administrators went after it and made up our minds we would get it if we had to apply Billy Sunday's "kick."

It seems to me, gentlemen, we need to concern ourselves little or nothing at all in regard to any class of citizens dreaming away their lives in the midst of mysticism and medievalism. What we want is a definite result; a boy with the proper preliminary education, with his attention and lines of education (at a proper period) drawn toward his future goal, namely, his life work. And if the colleges of the country will not meet the condition as other colleges in other civilized countries have met it, then we can well afford to let them go on and dream away and we can smile at your cries for help.

I know nothing that has pleased me more than to have heard the viewpoint of the idealist on these matters but I have heard nothing that has so convinced me of the superiority of the administrator and his frankly advancing methods over those of the idealist and the educator and the pedagogue who proverbially has been almost immovable in his self-satisfaction and self-sufficiency. I have heard nothing that has so convinced me that those of us who are working for practical ends and are getting results, are in the right.

DR. H. D. ARNOLD, Boston: While I am the latest and perhaps the least experienced member of the Council on Medical Education, perhaps coming to the work with a little freshness of view, my observations may not be without value. President Pritchett emphasized his friendly attitude toward the Council. I think it is perfectly clear, without speaking of it.

There are two thoughts, however, about the usefulness of his remarks which are worth emphasizing. One is that he can come here and say some pretty plain things to you men, who represent the medical schools, which the Council is not in a position to say. President Pritchett is an eminent man in education, recognized as an expert, and he certainly is impartial. The Council is composed of physicians; and when we are talking to other physicians, a question might possibly be raised as to our judgment, or as to our being prejudiced. In the same way that the Carnegie Foundation report in 1910 could say things and give publicity to the classification of the Council on Medical Education, when the Council hesitated to take that step, I think that President Pritchett's attitude to-day is very helpful, in that he was able to say a few things which the Council could say with less grace.

Second, he has told you that a definite classification is practically impossible. Perhaps you will be a little more lenient with the Council, if it does not make a perfect classification. Dr. Bevan spoke of our classifications as being steps in advance, and temporary. That is all we claim for them.

President Pritchett spoke of the unfairness, in a way, of the ten items that we take as a basis for classification; that they are not equally balanced and yet we give equal weight to all. That is a perfectly fair criticism, which every member of the Council recognizes. On the other hand, one aspect of that classification has been of value. It has been educational, as well as for the purpose of standards. We found the schools lacking in certain things. It was very difficult to get them to come up to some needed improvements. Take a library, for instance. One of the weakest points in the medical schools, as we found them,

has been the library. Perhaps in our classification we gave this item an exaggerated importance, but this emphasis resulted in much needed improvements. We have only regarded this classification as temporary, and as serving the purpose of stepping up the ladder a little bit higher.

President Pritchett brings up the question of a permanent basis of classification. Perhaps we are ready for it. I am not quite as optimistic as he is. He offers three groupings of medical schools, and the Council is grouping them into three classes. We differ only as to where we should draw the lines between the different classes. He has taken a very high class for the top; a low class, which we would both exclude; and a middle class of doubtful schools. He has not discussed the practical application of these divisions, as regards the State Boards. The Council is taking into consideration the practical application of any classification, as an aid to the State Boards in their work.

One other element which he introduced is ideal, but of a type that the Council has hesitated to apply, namely, the great importance laid on the estimation of the quality of the instructors. There is no rule or measure that you can apply to the personal element of instruction. We have not seen any way in which this factor could be measured in such a way that it would appeal to everyone as being fair. It is liable to the charge of unfairness, since it must be based on personal estimate and is therefore open to the question of prejudice.

I think President Pritchett's address on this subject at this time is most helpful, and perhaps the Council will get great light from it as to the basis of the future grading and classification of medical schools.

DR. J. W. HOLLAND, Philadelphia: Many sides of the question debated have had justice done to them, but it seems to me there is a word more to be said. The Council, several years ago, conducted a census to determine the average age at graduation in medicine and the result showed that in three or four of the leading universities of the country it was 27 or 28. Since that time, in Pennsylvania they have added a year of hospital work as absolutely necessary before one can begin the practice of medicine. Some of the hospitals of Pennsylvania that three years ago were satisfied with one year of hospital work insist on a contract with the "intern" that he shall spend with them one and a half or even two years. One of the best hospitals in the city of New York will not accept an "intern" unless he agrees to spend thirty months. Now, starting with an average of 27 or 28 at graduation, and adding a year, or two, or three, a man is well on towards 30 (and, mark you, in Pennsylvania it is required by law—it is not a matter of option) before he can be accepted for the state examination to practice. In the school with which I am connected this census showed the average age at 26. In the other schools to which I referred the years of preparation were more extended, and the inference was plain that the students spent so much time in preparation that they were landed far along in years before they got the right to engage in bread-winning pursuits. A very wise pedagogue has laid down the dictum that a man ought to be at his bread-winning pursuit by the time he is 25 years of age. A few years ago there appeared an interesting work, which showed, from an examination of the lives of distinguished men in every branch of life, that they got at the business in which they reaped their reward of high success by the age of 25. The reason is

biologic. The clinician who deals with the "intern" in a hospital knows that a man of 30 is not so useful as an "intern" as a man of 25 or 26. He is not so much interested in the business in hand. He is not so energetic, not so adaptable. The point to which I am tending is this, that the factor of age at which a graduate begins the business of life should be considered by practical men. To get at that you take the average age under the existing conditions. In conversation with Dr. Hallett of London, when he was here, in answer to my question as to what he thought about the average age of 28 or 29 at which medical men from certain colleges of this country begin their life work, he said that, in his opinion, it was entirely too late. I asked him how the situation stood in England, and he said the average was 25 or 26 and that Parliament would never stand for an official system of education which in actual practice required that a man be 27 or 28 before he started to earn a living.

Mr. Flexner, in his admirable report on medical education in Europe, said that the average age in Germany, with their highly elaborate five-year medical course, was 25, and they aim to get a man at the business of life at 25 years of age.

One of the inferences which was drawn by Dr. Bevan, and by many others interested in this question, was that something was wrong in a system of education which postponed the bread-winning period to the large number of men as late as that. It was recommended that a few years be cut out of the preparation. Hence some of the universities have reduced their preliminary requirement from the A.B. or B.S. degree down to two years in college.

The question in Pennsylvania arose, as Dr. Baldy said: What is the minimum time after a student has passed through the four-year high school in which he can prepare himself with the necessary knowledge preliminary to the study of medicine? I put it the "necessary knowledge." Of course, as physicians, technicians in a large sense, we must look at our education from the utilitarian standpoint. We are not concerned with "the mysticism of educational ideals." We must utilize our time. A very sound pedagogic doctrine is to make every year count and not to take two years to do what can be done in one.

The law in Pennsylvania was fixed at a year of science preparation in physics, chemistry and biology. It was based on the knowledge that in Great Britain that is the rule. It was insisted on that preparatory education in these branches is a medical concern. The General Medical Council of Great Britain has never conceded that supervision of preliminary instruction in chemistry, physics and biology is the concern of any other body than the General Medical Council. It is their business to see that it is done right, from the medical standpoint. In Canada it is viewed in the same light. The consequence is that McGill University has a five-year medical course, the first year of which includes chemistry, physics and biology, and it is generally conceded that McGill is doing good work.

A number of American medical schools have the pre-medical year, and I know that it is the experience of some of them that the students who get their physics, chemistry and biology in that year in the medical school are quite as well advanced in preparation for medical study as those who get the same subjects during two years in a literary college.

SOME FALLACIES IN THE ARGUMENT AGAINST FULL-TIME CLINICAL INSTRUCTION

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In a recent paper, published in *Science,* Dr. S. J. Meltzer comments upon two notable facts in connection with the present rather active agitation regarding full-time clinical instructors. The two facts singled out by him are (1) the appointment of full-time professors of medicine, surgery and pediatrics, by the Johns Hopkins University, and (2) the disparagement of the Johns Hopkins plan by the Council on Medical Education of the American Medical Association. Dr. Meltzer's paper itself constitutes a third notable fact, in that it represents one of the very few unqualifiedly strong appeals that have been made by a clinician in favor of full-time clinical instruction. Although engaged at present in so-called fundamental research, the current of Dr. Meltzer's life has been clinical to so large a degree that his conclusions cannot be questioned on the ground of academic impracticability. He analyzes the report of the Council with logical seriousness; and were it not for the artifice of a single italicized word, one would scarcely feel the flick of Meltzer's lash or realize the seriousness of the attempt of the Council to laugh the cause out of court. Dr. Meltzer, by rare grace and tact, forges an argument so uncommonly well tempered as to render supportive discussion almost unnecessary. And yet, if there be any force in the plea for full-time heads of clinical departments, it lies in the line of duty of those of us who are clinicians to develop its full strength by discussion.

In such a discussion, as indeed in all such discussions, nothing contributes so much to balance and rationality as does a proper conception of the historical perspective of the problem involved. It is essential to realize at the outset that the question is not a new one, involving American medicine alone. Many men would have us believe that suddenly, as a result of this, that or the other tendency, our clinical instruction in America has been found wanting, and that with typical American impulse we have set to moving in the sacred realm of education, the machinery of experiment. As early as the seventeenth century Leibnitz attempted to justify his faith in quacks, on the basis that doctors were improperly trained as men of science, and that it was hopeless to look for the development of scientific teachings and methods in a prac-

titioner, "who does nothing but run from one patient to another and who, when he is visiting one patient, is already thinking about the next one."[1] Almost half a century ago Billroth anticipated the Flexner report on medical education, in his "Ueber Lehren und Lernen," a work necessarily less modern in tone than Flexner's, less broad in the geographical consideration of the subject, but not a whit less emphatic in the assertion of corrective principles. Coming down to more modern times, we have the report of the royal commission on university education in London (1913), in which it is admitted that "the academic training received by medical students in London has not always been distinguished, and that the scientific spirit has been too often wanting." We in America also have found that, even in our best schools of instruction, the scientific spirit has been too often wanting, and we have found it wanting chiefly in the clinical branches. On this basis rests the agitation for full-time clinical instruction.

The phrase "full-time clinical instruction" signifies that the teaching of each major clinical subject be under the supervision of a properly qualified instructor, who shall serve as the head of his department, who shall devote all his energies during the working school day to the management of his department, who shall receive an adequate compensation for his highly specialized labor and who shall be protected against the inevitable lures and enticements incident to his position, by a provision which denies him the right to accept private fees, or permits him to accept them only on such conditions as may be imposed by the university.[2] This is the simple statement of the case. And as the question stands at present, its importance resides not in the working out of a detailed scheme of clinical instruction under such a plan, but rather in formulating a critical judgment regarding the advisability and practicability of so modifying our method of clinical instruction as to make it conform to other approved methods of education.

When we have said this, we have hinted at one of the most paradoxically inexplicable phases of medical education. It may be stated that almost without exception, clinical teachers realize the essential necessity for full-time men in all of the fundamental branches of medicine. The very canons of education demand such a system. Yet a large number of these same clinical teachers assume that there is such a wide divergence between the teaching of the fundamentals and of clinical medicine, as to render wholly unwarrantable the conclusion that clinical teaching also should

1. "Der nichts thut als von einem Patienten zum andern rennen, und wenn er bei dem einen ist, auf den andern schon denket."

2. We purposely omit details of organization, such, for example, as the number of full-time salaried assistants necessary to the successful conduct of a department.

be based on that plan which alone is best suited for instruction in fundamentals. It is, for very self-evident reasons, natural that the scheme for full-time clinical instruction should have the strong support of most of the teachers of the fundamental branches. It is not so easy to explain the fact that opposition to the plan has practically always come from clinicians. Such a clean-cut division into camps is unfortunate because it has set in motion a controversy tinctured with bitterness. The so-called laboratory men are charged with a tenacious hold on impractical ideals, limited by virtue of a narrow occupational horizon; and the clinical men are, in their turn, supposed to typify the old story, repeated in myriads of forms, of privilege clinging to tribute. Neither of these assumptions is entirely correct; both of them are essentially harmful because they drag the argument down to the low level of personalities. Disagreements of this sort usually rest on fallacious judgments. An unqualified advocate of the full-time clinical instructor, I have, for the past few years, noted various fallacies, patent or concealed, in the arguments against this plan of instruction; and the only object of this contribution is to examine these various fallacies, with the hope of clarifying a fairly well-confused topic.

Of all the fallacies responsible for both bitterness and confusion, the one most responsible is the assumption that full-time clinical instruction connotes a clean sweep, displacing all teachers who are private practitioners and replacing them by non-practitioners. Such a plan has the advocacy of no one. Barker, in his address on "Tendencies in Medical Education," falls into this particular fallacy when he develops the thought that "the present incumbents of clinical chairs," by virtue of "the rightfulness of the kind of work done by them," hold their positions in "good faith." He pleads the cause of these "honest, hard-working" men in such fashion as to warrant the inference that they are all to be displaced, and that their displacement is a breach of moral contract on the part of the university. Dr. Barker certainly does not, nor should any one else, minimize the value of such services as are rendered at Johns Hopkins University, for example, by those clinical men who are not on a full-time basis, simply because at that university there are academic heads to medicine, surgery and pediatrics. It is supremely important to recognize the fact that the varying character of clinical material will always make it both advisable and necessary for the university to offer place and preference to the properly qualified clinical teacher irrespective of his affiliation with private practice. The full-time clinical instructor, together with his staff, is a necessary adjunct in organizing, coordinating, and correlating the practical as well as the investigative work of his department, just exactly as the dean of a school is an adjunct in developing school spirit and school

policy. The advocates of the full-time instructor should never, not even implicitly, subordinate the teaching value of the properly qualified private practitioner.

Even broader in scope is the fallacy that there is an important and essential variance of principle in teaching the clinical phenomena of disease, and in teaching function and structure or aberrations of both, in the laboratory. It is difficult to analyze this fallacy and at the same time avoid an undesirable discussion of the primary pedagogic principles involved in teaching medical students. It may be pardonable, however, to dip into abstractions just deeply enough to say that whether our efforts at teaching be confined to the fundamental or to the clinical branches, our aim is toward equipping our pupils to form proper judgments. If, as a result of their training, our students can affirm or deny conclusions, either by proper process of reasoning or by the direct comparison of objects to ideas, we may rest easy in the thought that the discipline of their medical education has been fruitful. And the process by which they should be taught to form proper judgments is exactly the same in the hospital ward as it is in the laboratory. In both places the student is taught to know certain fundamental truths, and from these he is taught to reason certain definite conclusions. The fact that in so many hospital wards and clinic rooms the student is taught to know, to the exclusion of being taught to think, is responsible, in large measure, for the fallacy that clinical teaching is, part and parcel, separate and distinct from fundamental teaching. If one doubts that clinical teachers err with hopeless frequency in this direction, let him pick up at random a number of clinical text-books and examine them critically. The conclusion will be unavoidable that preponderant stress and effort is laid on crowding the student with facts, on teaching him to know. One of the most recent clinical text-books states in its preface, that the very best a teacher can hope to do is to teach his student to know.

This particular fallacy regarding the specific difference between fundamental and clinical teaching should not be dismissed by merely stating it. It is essential to expose the danger to which it leads. And this can be done no better than by quoting a sentence from the report of Dr. Bevan to the Conference on Medical Education (1914). Dr. Bevan says, "Clinical teachers know that in the very nature of things (Dr. Bevan furnishes no addenda as to why only the clinical teachers know, or as to what the very nature of things is) the teaching of anatomy and pathology is in no way parallel to the teaching of medicine and surgery, because the teaching of medicine and surgery are inseparably associated with the practice of medicine and surgery." Dr. Bevan allows us absolutely no other alternative than the conclusion that anatomy and pathology are not inseparably associated

with the practice of medicine and surgery. Surely Dr. Bevan cannot hope that this conclusion will go unchallenged.

On the part of the clinicians there has always been a tendency to introduce this notion of the subtle, specific teaching value of private practice as a sort of abracadabra, charm, amulet, something to conjure with in the realm of medical education. They have studiously avoided the fact that the plan for full-time clinical instruction contemplates developing the principles of practice in their most utilizable form, namely, from a variety of clinical material, intensively correlated and studied, and housed under one roof. Is there more to be learned of the basic traits of human nature on Fifth Avenue or on Michigan Avenure, than there is in the wards of Bellevue or of Cook County Hospital? Or does the wealthy patient have a more legitimate demand on a larger share of the sympathy, interest, pity or sweetness and light of his doctor's pervasive personality than does the helpless sufferer in the charity ward? The plan for full-time clinical instruction does contemplate the full realization of the intimate relationship between teaching medicine and practicing medicine; what it does not contemplate is the injudicious mixture of private practice and teaching. And in this particular the plan is strong against all attack or argument, for the very reason that the majority of clinicians do not (and very properly do not) use their private patients as teaching material and could not do so even if they were so minded.

And all this leads up to another false assumption. It is argued that since from the viewpoint of medical education so little store is laid by a man's capacity to gain and hold the medical confidence of a large clientele, and to serve it intelligently and well, it necessarily follows that the rôle played by the private practitioner is less ennobling than that of his fellow, who elects to be exclusively a clinical teacher. The practicing physician very naturally resents such an inference. In reality any conclusion which sets a comparatively lower value on the services of the private practitioner than on those of the exclusive clinical teacher by reason of the fact that material remuneration is greater in one field than in the other is a *non sequitur*. Certainly all thinking men realize that between the spirit of practice and the spirit of teaching there is no essential ethical difference. The value of effort in either field is directly proportional only to the grade of intelligence and purpose back of it. But between the demands of practice and the demands of teaching there is a variation so pronounced, qualitatively and quantitatively, as practically to preclude the proper performance of both these functions by the same individual. The full-time plan, therefore, rests upon this very rational conception of the case and implies absolutely no measure of comparative worth between the vocations of practitioner and teacher.

In the teaching of such eminently practical branches as law, engineering, commercial chemistry and other technical specialties, the need of the full time instructor has been recognized and met. There seems to be nothing specifically so different in the practice of medicine as to demand that it be regarded as an exception in the general field of education. On the contrary, the teaching of clinical medicine demands the services of unattached men more urgently than does the teaching of any other practical art or science, because the two purely physical elements of time and fatigue enter so intimately into the problem. Barker has emphasized the overwhelming amount of correlated knowledge to be appropriated by the clinical teacher of to-day; an amount of data almost sufficient "to suffocate" him. This process of appropriation requires, in addition to intelligence, a very definite number of hours and minutes each day. An active practice rarely grants the necessary surplus of time. If, however, by a process of "speeding up," the practitioner succeeds in cleaning his slate, in order to fulfil his teaching obligations, he is very apt to find himself face to face with that other disturbing physical element — fatigue. It has always seemed a remarkable fact that the study of fatigue in its relations to efficiency should have been confined to the industries. We accept as true the fact that more than a given number of hours in his cab renders the locomotive engineer an unsafe person to differentiate between the two primary colors red and green, but we have to prove by argument that the busy surgeon can shoulder the ennervating duties that confront him day and night, and still be fit for one of the keenest of all mental disciplines, the proper teaching of science.

Let us pause here just long enough to emphasize this word science in its relationship to clinical medicine. Not the least significant of the various fallacies that we are examining is the one that has to do with the thought that the fundamental man must be a specialist and must be on a full-time basis, because, although of course he is a teacher, he is also an investigator and must therefore have the necessary time for scientific research. By inference again we are subtly led to believe that scientific research is confined to anatomy or physiology or one of the other cognate fundamental branches of medicine, and that it need not be reckoned with in considering the teaching of the clinical branches. Those who favor the plan of full-time clinical instruction are influenced in no small part by the hope that the properly qualified clinical teacher, favorably situated, will foster, stimulate and direct scientific clinical research of a higher order than is commonly produced under our present system of conducting clinical teaching. Clinical investigation is, of all types of investigation, probably the most intricate and difficult, for the reason that the problems studied are of such a nature that the factors entering

into them cannot, as a rule, be varied at the will of the investigator. If, therefore, we hope to encourage worthy product along the lines of scientific clinical research, we must, to say the least, provide the clinical teacher with an environment as favorable as the one with which we surround the fundamental teacher. It is no answer to this argument to quote the numerous examples of epochal discoveries made by busy practitioners. The superman will inevitably enrich his field, in the face of compromising odds or even of grueling adverse conditions. The problems of education always deal with averages, and what we desire to see is a system attuned to producing from among the common ranks of medical men a proportionately large number of clinical teachers and investigators.

We base our hopes on the full-time plan as an aid in attaining this worthy end, and all seems well until we are rudely halted by the oft-cited example of Germany, the nourishing mother of all that is best, and stable, and approved, in medical education. Germany has no full-time clinical instructors, and what is more, the very men whom we all recognize as her leading clinical educators have not a particle of sympathy with the American full-time plan. Here truly is a stumbling block. And yet the explanation is not so difficult as it appears to be. German clinical teachers, in spite of their unqualified rights to practice, have mortised themselves into medical history, so that their names fairly dot pages. More than that, practically every great German clinical teacher has developed about him a so-called school of younger men. By contrast, we have at home a proportionately very small number of names that even the most chauvinistic among us would set up with the leaders of German clinical thought, and only comparatively few of our clinical teachers have grouped a school of enthusiasts around them. But this contrast does not signify that the German clinical professor is efficient because of his uncompromised right to practice. At all events, it would be difficult to establish proof to this effect. It seems much more likely that he is efficient in spite of the fact that he shoulders the distractions of practice. Indeed, those who have come into intimate contact with the directing heads of clinical departments in Germany know that many of them resolutely set themselves against these distractions. Friedrich Mueller of Munich may be selected as a type. Mueller considers his two-hour "sprechstunde" devoted to private patients as a type of relaxation, comparable to golf, mountain climbing or other forms of diversion. No inducement will persuade him to lengthen the office hour, and he refuses to make extra-urban visits, under ordinary circumstances, unless there be some teaching value inherent in the call. His serious work is his teaching and directing, to both of which he devotes consummate care and consequently a large amount of

time. Between Mueller as teacher of medicine and, let us say, Marchand as teacher of pathology, there is no essential difference. They are both so-called fundamental men, each in his own specialty, and Mueller represents the type that the advocates of full-time instruction in America hope to develop — the fundamental clinician as teacher.

If we were asked why we concede that private practice has not militated against the development of the highest type of clinical teacher in Germany and has so markedly militated against it in America as to call forth an edict of interdiction, we should answer only that the variance between German and American culture and traditions so profoundly influence thought and act as to render it impossible to graft, unaltered, a system of thought from one country to the other. It is likewise equally impossible to argue that because certain conditions are favorable, from an educational point of view, in one country, they must of necessity be favorable in the other. The German is the type of patient, plodding lover of *gemütlichkeit,* who, certainly up to recent times, did not labor in medical fields under a very heavy stress of commercial competition. Tradition requires that he advance to scientific preferment only through a dozentship, and this in turn implies approved excellence as a teacher or producer. The American, on the other hand, is the mercurial, restive type, who hasn't even a word in his vocabulary with which to translate the word *gemütlichkeit,* and who labors medically in a strenuously competitive atmosphere. The fact of the matter in essence is simply this, that up to now the German clinical professor has, as a rule, needed little or no protection against himself, whereas the American clinical professor has so frequently demonstrated the need of such protection as to call forth that forcible truth from Dr. E. P. Lyon, who characterized clinical professorial selfishness by the phrase, "lying full length in the trough as he eats." If a sufficiently large number of American private practitioners had demonstrated their capacity to combine teaching and practice as the Germans combine them, there would probably be no call for the full-time clinical professor. They have failed to demonstrate this, and they cannot explain that failure on the basis of German example.

Indeed, this failure on the part of the clinical teachers to teach as intensively as do the instructors in the fundamental branches is alone responsible for the agitation for the full-time clinical instructor. Whether they accept it or not, the burden of proof lies upon those who argue against a plan that attempts to do for clinical teaching exactly what has been recognized as essential in practically every other branch of education. For many of us it is difficult to see how the introduction of full-time clinical instruction can possibly fail to accomplish most of those things which we hope to see result from it; for all of us who are

interested in seeing the reform meet with warm, broad support, there is much chagrin and disappointment in contemplating the half-hearted support and whole-hearted opposition accorded it. This chagrin and disappointment may be considerably tempered, however, if we bear in mind the truism spoken by President Lowell in his address before the New England Association of Colleges last year. "Education," said Mr. Lowell, "is the last of all things to follow the stream of human thought and progress. It is still mainly in the deductive stage." If Mr. Lowell be correct in his statement, we may seek solace in the thought that we have at least an explanation for the fact that so many well-meaning clinical men experience difficulty in accepting an inductive syllogism, the conclusion of which is, The teaching of clinical subjects should be under the guidance of exclusive clinical teachers.

DISCUSSION

DR. WILLIAM H. WELCH, Baltimore:* I regret exceedingly that I have to leave in order to catch my train. I wish to thank Major Seelig for his admirable paper. There are two or three points to which I wish to refer. I have thought it was perhaps a little premature to discuss the question, so long as it has been put into action, and whatever arguments may be advanced on *a priori* grounds are likely to be futile by actual experience. It has to be tried out, and then we shall know the effect.

The second point in this: Dr. Seelig has commented on the report of the Council on the subject last year. I have never cared to do so. It was unfortunately unfriendly toward the plan, but it was based on such misapprehension and misstatement of facts that it corrected itself, and I would not want to say a word to lessen in any way the influence of the Council in the great work it is doing for medical education. As regards the division on the subject, it is not altogether as between laboratory and clinical men. There are some laboratory men who are opposed to the plan, and there are many clinical men, particularly of the younger generation, who are strongly and enthusiastically in favor of it. I think the opposition is to a very large extent among those who perhaps will be affected by it. Any how, it is true, of course, that the heads of these departments are no longer to be in the hands of the large outside consultants. It is human nature that they should (without for a moment imputing their motives) think of every possible argument that can be raised against the proposition. I think they should themselves, perhaps, bear that point of view in mind.

As regards the German situation, as Friedrich Mueller himself said, in his testimony before the Commission at the London University, they have such potent ideals there that this restraint, he thinks, is unnecessary, but he himself, as I happen to know, has modified to some extent his view, and it has become a matter of very serious discussion and concern in Germany, because of some very notable instances, including one very conspicuous one of a German clinician, of opposition to this idea. And, then, too, the surgeons in the German universities are establishing their own

*Stenographic report.

private institutions. In Breslau, Wurzburg and other places the surgeons now have side by side with their university work their private sanitaria. It is wrong, and they know it is wrong. So that we cannot any longer look on Germany as our ideal in this regard.

As regards the clinical full time men — so-called: Is it not true that the more varied, the larger the experience of a man in any field of life, the more useful that man is? The anatomist loses a good deal by not being a surgeon, but who is going to advocate any longer that the anatomist shall be a surgeon? The physiologist might be an admirable practitioner, as Brown-Sequard illustrates, in many ways, but who advocates that he should be? That is, the clinical teacher misses something by not having an outside consulting practice; he misses more by not having a family practice; he misses more by not having a practice among the poor as well as among the rich; he misses more by not having an urban instead of a country practice, because it is the resourceful country doctor who, after all, has the most large and varied and in many ways useful experience. But no one any longer advocates that it is to the country doctor we can look as the head of our work. The time has come when it is entirely impractical for a man to do all of this work.

There are many other points I would like to discuss, but myself rejoice that the plan is going to be tried out, and I feel personally so confident that it is the great advance reform in methods of medical education in this country, and that we should have the sympathy of the Council and of the whole profession in this matter, and I do believe we have it really, notwithstanding a few rather unfortunate remarks which have been made on the subject, that it is one of the things that is going to put our American medical schools in the lead, I think, of all the schools in the world.

Dr. Walter L. Bierring, Des Moines, Iowa: I was very glad that Dr. Welch could speak first on this matter, as he has the distinct advantage of a year's experience in observing the working out of the proposed plan of full time clinical teachers. It has seemed that in the previous consideration of this subject there has been a fear that in this new departure there was an attempt to displace the more established methods of clinical teaching, that it would tend to sacrifice the human element, and closer contact with the profession, which has always been regarded as so essential. On the contrary the proposed plan is to be considered as an aid to clinical teaching and in that sense is a distinct addition to our methods of medical education.

The plan has been criticized from its ethical side, in that it is supposed to work an injustice to the profession, savoring of a form of dispensary abuse, by permitting the well-to-do patient to have superior professional advice at a lesser fee, again in not permitting the fees to go to the person performing the service, there was an element of unfairness. But Dr. Welch has clearly explained this, by stating that the fees go back to the department where the service is done, thus furthering its usefulness, and really approximating to the highest point of social service.

One of the most gratifying features in the modern development of medical education is that clinical teaching is coming into its own, and its problems are dignified by scientific approval.

Reference has been made to comparison with European methods of clinical teaching. We have come to regard the plan as it prevails

across the water, particularly in the German clinic, as ideal, and while prominent clinicians like Prof. Friedrich Mueller of Munich do not seem to be in entire sympathy with the American plan, any careful analysis of it will show that it really incorporates all of the advantages of the European method, and at the same time seems much better suited to conditions as they now exist in this country.

Examining Boards have been criticized as being too indulgent in their sympathetic tolerance of prevailing educational methods and tardiness in exacting certain standards, but I am sure that this new departure in clinical teaching will be hailed by all who have to do with the judging of licentiates.

Everyone will be in full accord with the thought that it means not only a distinct advance in clinical teaching, but it will promote a better appreciation of the fundamental sciences, and give to them a practical application such as they have not received before.

Above all must be considered the benefit to human welfare and the improvement of the general practitioner.

DR. ARTHUR DEAN BEVAN, Chicago: I should like to say just a word in regard to Dr. Seelig's paper, which, I believe, is in order at the present time. If Dr. Seelig had been at the meeting yesterday and heard the report presented by the Council on Medical Education, I doubt very much whether he would have presented his paper to-day. There has been apparently an effort made to introduce into this matter controversy, when none exists. Dr. Seelig builds up a man of straw, and then knocks it down. As a clear demonstration of that fact, I call attention to the report by the Council yesterday. In other words, I refuse, in the name of the Council, to be a party to any controversy on this subject. The Council is very much convinced of the necessity for the reorganization of clinical teaching along the right lines. There is no question about that whatever. The questions are simply matters of detail. There are probably three solutions for this reorganization that might be considered. The first, let us designate it, as the German solution, represented by such clinical teaching as has been done by Kocher, Friedrich Mueller, and von Eiselsberg, and the men in the best German clinics, where the man is a university teacher in the best sense of the word, where he does a limited amount of practice, and that would be left, as Friedrich Mueller says, to his own conscience. This position is taken by the best German clinicians. Friedrich Mueller, in his testimony before the London Conference on Reorganization of Teaching, in the University of London, made very clear his position, that he felt that the university teacher should be in the best sense a university teacher. He, however, very emphatically took the position that he should not be excluded entirely from private practice, and cited the instance of a similar situation in the law school, where he regarded the complete separation of some of the teachers in the law school from practical work as most unforunate. The German plan is one solution that might be very well considered.

Now, the second solution is what we might designate to-day as the Brigham solution, which has been adopted by Dr. Cushing and his associates in the Peter Bent Brigham Hospital. This varies somewhat from the German solution of this question. Friedrich Mueller, for instance, will have his consultations two hours a day at his office. He

appropriates Sunday also, as he told me, personally, for out-of-town visits, but would not go out of town any other day in the week except Sunday. The Brigham solution is this, that all the man's work in medicine is to be done under one roof. He is not to have any consultations outside of the hospital. He has an office in the hospital. If people desire to come there and see him, he can see them all at his hospital. Further, a limited number of private beds are set aside, and the clinician takes care of a certain number of private patients in these beds, with the same team of assistants and laboratory workers, and all that he employs in taking care of his charity cases and his cases which he uses in his clinic. As a matter of fact, Dr. Seelig is quite wrong in saying that private patients are never used for teaching. One of the most important clinics given in this country is given by a colleague of mine, largely devoted to diseases of the stomach. Very often he has as high as twenty-five or more stomach cases in his service at one time, very largely private patients, and a large number of these private patients are used for clinical instruction, and are very glad to be so used. Again a patient who pays a surgeon a thousand dollars for his work in an operation may be quite as valuable a unit in a clinical research as the patient who occupies a ward bed and may be utilized very frequently in both clinical teaching and research.

Now, the third solution is the solution that has been presented by the General Educational Board. I am quite in sympathy with the general plan. They have, however, introduced an error, a wrong, which would not have been introduced if the plan had been devised by men who were familiar with the clinical work. Now, what is that error? It would be quite proper and may be a very good solution to put a clinician on a salary and exclude him entirely from private practice. I take it that is a very proper plan and I do not know but that it may work out in many clinical positions. But there is an error that has crept in, which must be analyzed, not by the laboratory man, not by the presidents of the universities, but by the medical profession. That error is the introduction of the clause permitting that man to do private practice, with the understanding that the fees from that practice go, not to himself, but to the department of the university. Such a proposition is not only grotesque; it is clearly unethical and illegal. No man and no institution has a right to appropriate the fees paid for the peculiarly personal service rendered by a physician or surgeon to a patient except the man who renders such service. It would be clearly illegal for an institution to charge for such services and if they attempted to collect them they would have no standing in court whatever. This part of the Johns Hopkins' plan must be eliminated and if their clinicians are to be on a salary and not permitted to do any practice then the medical profession will insist that the clinical work of such men must be entirely limited to such patients as can not pay any member of the medical profession a proper fee for medical services.

As I say, I am quite sure the Council on Medical Education is not taking a controversial attitude in this matter. They are not going to permit themselves to occupy a controversial attitude in this matter. They are very much in sympathy and are going to use all of their influ-

ence to attempt to develop the reorganization of clinical teaching on the right lines.

Now, I take it, gentlemen, that in this reorganization of clinical teaching the big factor, the determining factor is the medical profession itself. The mistake made in the Hopkins' plan is simply one incident in a great big question. The big question is the reorganization of clinical teaching on the right lines, and I have every confidence that that is going to be done, and that it is going to be done within a very short time and done by the medical profession itself, and in a way satisfactory to the profession, and in a way that will conserve its interests and dignity.

MINIMUM EXPENSE OF MAINTENANCE OF FIRST TWO YEARS OF AN ACCEPTABLE MEDICAL SCHOOL

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I understand the purpose of this paper is to start a discussion, and it has seemed best to introduce such a discussion by an attempt at a very general analysis of the expense.

The cost of each of the laboratory departments falls under three general heads:

1. Salaries.
2. Maintenance (material, supplies, etc., which are used up each year).
3. Additions to equipment.

If a department is being built up this last will be large, but for the purposes of this discussion it is best to assume that the school is fully equipped, i. e., has its buildings, and that the laboratories, as far as space is concerned, will need no changes; that the furniture of the laboratories is all in place, and that each laboratory has modern equipment for fifty students in a class, and that the files of its journals and its library are in good shape.

This premise may seem very Utopian, but the subject of this discussion is the maintenance of these departments, not the starting of them.

The question as to the investment represented in such a basic equipment does not pertain to this discussion, but aside from the building and fixed furniture the movable apparatus for each laboratory sufficient to care for the teaching of fifty students in a class is not far from an average of $5,000 per laboratory. It is relatively smaller in chemistry and pharmacology than in anatomy and pathology, where microscopes alone represent in each case an investment of about $3,000.

This figure of $25,000 for five laboratories is conservative. To this should be added at least $10,000 for a working library of standard works and journal files; and again, there must be added a valuation of teaching collections, especially in anatomy and pathology. The value of such collections and their cost are quite different figures. The teaching collections can hardly be purchased, but must be accumulated. These certainly represent a value of $5,000. There is represented, therefore, in the equipment of five laboratory departments, at least $40,000. By this I

mean movable equipment, personal property of the laboratories, as distinguished from realty, consisting of buildings and fixed furniture attached to the building. Starting with this equipment of a minimum value of $40,000, what is the annual cost of maintaining these laboratories, teaching fifty students in a class and indulging in a reasonable amount of research in each department? The work of the first two years may well be put under five laboratory departments, viz.:

Anatomy (including histology and embryology).
Physiology.
Chemistry.
Pathology and bacteriology.
Pharmacology.

Some will differ with me concerning this classification. Of course, histology and embryology might be considered separately, or bacteriology might go with hygiene to give a total of six or seven laboratories, but we are trying to keep to the minimum.

To simplify the presentation, I am going to discuss the average minimum cost of these departments. This does not mean that the cost of the several departments are equal, for such is not the case, but some of the inequalities can be pointed out later.

As a basis the following table is presented:

SALARIES			
1. Professor	$3,000	(+ $1,000)	
2. Subordinate teachers	3,000	(+ 1,000)	
3. Dieners and technicians	900		
EQUIPMENT			
4. Current journals and occasional additions to library	200		
5. New apparatus, replacement of breakage, repairs to apparatus, replacement of worn out apparatus	500		
MATERIAL			
(Cadavera, animals, embryos, reagents, etc.), per student—			
Anatomy	$25		
Physiology	20		
Chemistry	5		
Pathology and bacteriology	15		
Pharmacology	10		
Average	$15 × 50	$750	
	$8,350 × 5		$41,750
Additional subordinate teacher in anatomy	$1,500		
Additional technician in anatomy	900		2,400
			$44,150

1. The figure I have assumed for minimum salary is open to question, but I feel it is not too small. An acceptable school must have at the head of its laboratory departments men who are not only capable of directing the teaching, but also of doing and directing some research. Such men, when they start in a position, may be willing to accept somewhat less than $3,000, but as these continue in the work they deserve and must receive some increment, so that the average of the five professorial salaries is certainly $3,000. Some administrators of medical schools may say this is too high, but the teachers themselves will say it is too low by at least $1,000. It should be remembered that the professorial salary scale in a very considerable number of our schools is now $4,000 or above. I feel sure this figure of $3,000 is not too high when we consider the supply and demand. It is, moreover, likely to increase in the future.

2. It seems to be a fair generalization to say that the expenditure on subordinate teachers should at least equal the salary of the professor.

To teach a class of fifty students there should be at least three teachers to each department.

In laboratory exercises an instructor cannot care for over fifteen to twenty men and get good results.

Such a teaching staff of three men to a department will require that all of them take part in each laboratory exercise, and that the didactic work be divided. Of course, all of these men should be full-time teachers. The day of part-time teachers in laboratory subjects of the first two years is rapidly passing. The many reasons for this do not need discussion here.

In anatomy, where there are two heavy laboratory courses, one in gross anatomy and one in histology and embryology, this force of three men is not sufficient and a fourth man should be added.

This gives a total of sixteen full-time men in the school, and eleven of these are subordinates at an average salary of $1,500. It is evident that this is a very low wage and there will be great difficulty in securing eleven competent full-time subordinate teachers at such a salary. There is probably as much or more reason for raising to $4,000 this minimum for subordinate teachers in each department than there is for the raising the average professorial salary.

3. Should a professor in a medical school say to a trustee who happens to be a bank president or head of a large business that the said trustee or his first or second assistant should do his own typewriting, we should expect the professor to be turned over to an alienist, but it is fully as sensible as to require the professor or his first assistant to do the technical work in his laboratory.

There is probably no greater waste of money anywhere in medical teaching than the common practice of the professor who is paid $300 to $400 a month doing work which a $50 to $75 per month technical assistant can do as well or better. The professor's time and energy should be devoted to work of a higher order.

There is a common practice in many quarters of using student assistants for such work. It is nearly as wasteful, because the student assistant is available only at irregular hours, and after a year or two at most gives up the work, as his clinical study absorbs more and more of his time. He is usually inefficient from lack of training in this peculiar line and from lack of interest, because he knows his connection with the job is only temporary. He is usually working only for the money in it. An exception should be made in the case of students assisting in research, for here there is an added interest and incentive that frequently brings a high order of efficiency.

A requisite of each laboratory is at least one technical assistant, who in time becomes very proficient. In order to make the place attractive as a career, there must be available at least $900 per year when this assistant has become efficient. Such a wage will hold good men for many years.

In anatomy there is urgent need of two such assistants, one in connection with the gross anatomy and one in connection with the microscopical work.

4. If a school is to attract and hold capable teachers, it must provide library facilities. We have assumed at the outset as a part of the initial equipment that there is a library representing $10,000 investment. There are constantly appearing monographs and reference works which should be added, and the journal subscriptions must be kept up and the requisite binding done. The amount necessary for this varies somewhat in the different departments, but the average figure of $200 per department is not too great.

5. In every laboratory there is a certain amount of breakage of glassware and apparatus, which must be replaced or repaired. Also the mechanical apparatus is wearing out and reaches a stage where it must be replaced. The life of microscopes, microtomes, kymographs, lanterns, oven, etc., is variable, and to some extent fortuitous. Some apparatus becomes obsolete and, moreover, new things of decided value are appearing, which a laboratory cannot afford to be without. It seems that on an initial equipment of a value of $5,000 we must allow at least 10 per cent., or $500, to keep the equipment up to date.

6. The cost of material, i. e., things that are consumed in the teaching, is very different in the several departments. It varies, though not directly, with the number of students.

The additional cost of this item for each additional student diminishes as the size of classes increases.

In chemistry the cost is relatively small, in anatomy very large. The two large items are cadavera and animals for the experimental work in teaching the courses in physiology, pharmacology, pathology and bacteriology, and for research in all departments. The cost of animals is not only the initial cost of securing the animals, whether bought or bred, but also the cost of care, feeding and a certain amount of death-rate in the animal houses.

The average of $15 per student (arrived at as indicated in the table) is not far from correct for fifty students. If the number of students be less, this amount per student must be increased; if the number of students be greater, it may diminish somewhat.

If the number of students in a class is thirty instead of fifty, the total of $44,000 for fifty students will diminish as to number of subordinate teachers by one teacher in each department ($1,500)— and for material by about $200 in each department — a total diminution for the five laboratories of $8,000 or $9,000, but the other items of the table will not diminish appreciably.

The foregoing takes no account of the overhead charges in connection with maintaining the buildings and grounds. This includes janitor service, heat, light, power, water, repairs, insurance, special taxation, such as street improvement, etc. It is impossible to estimate this, but probably considerably more than half should be charged against the first two years.

Also no account has been taken of general administrative expense, such as salaries of administrative officers, cost of office force, office supplies, librarian, advertising, etc.

These two sets of general expense must be charged in part against the laboratory years, and that share is at least $6,000.

We thus arrive at a minimum total of $50,000 for the two laboratory years, which I believe to be thoroughly conservative and too low rather than too high. This carries nearly all of the teaching of fifty students for two years, which is $500 per student per year.

The income from tuition and fees runs from $150 up, per student. Taking the minimum figure, we see that the students will pay $15,000 of this $50,000, while $35,000 (or the income on $700,000 at 5 per cent.) must come from some other source.

These figures have been arrived at not so much by the compilation of statistics of amounts now paid as by a consideration of the requirements of laboratories. I hope there will be a free discussion and I shall be not at all chagrined at free criticism of my conclusions. I have tried to be conservative in all estimates rather than extravagant, and have considered the various points from the view of the administration as well as from the view of the teacher.

THE MINIMUM EXPENSE OF MAINTENANCE OF THE CLINICAL DEPARTMENT OF AN ACCEPTABLE MEDICAL COLLEGE

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It is not easily possible to formulate an exact estimate of the minimum expense of conducting efficiently the two clinical years of an acceptable medical college. The experience of some schools in this field may, however, be of some value.

It is to be presumed that we accept the classification of the medical colleges of the United States as published by the Council on Education of the American Medical Association. If so, it is probable that the word "acceptable" would be applicable to those in Class A + and in Class A. For purposes somewhat analogous to the intent of the question under discussion, I have gathered reports of the total expense of a medical college to the university with which it is affiliated from as many of the schools in Class A + as were willing to give me the figures — twenty-three. They are most interesting, and they disclose a divergence in expenditure that is very wide. Take two examples.

I think we are all glad to acknowledge that the Johns Hopkins Medical School is not only the first school to teach medicine in the best way, but that it is still easily first amongst an increasing number of schools that are trying most earnestly to stand by her side. On pages 130, 131 and 132 of the "Johns Hopkins University Circular" for 1913-1914, is a description of the facilities for teaching clinical medicine which the school owns. It includes the Johns Hopkins Hospital and buildings which have cost "upwards of two millions of dollars," the Harriet Lane Home for Invalid Children which cost "over four hundred thousand dollars," the endowment of the Clinical Laboratory, "$10,000.00"; the Phipps Clinic for Tuberculosis, "$20,000.00"; the Phipps Psychiatric Clinic, cost not mentioned, and the Urological Institute, built and equipped and maintained by Mr. Brady. A conservative total for this entire equipment would probably be $3,000,000. A clinical faculty under pay is maintained in medicine, surgery and pediatrics, "while a considerable number of men engaged in practice aid in teaching, but give their services for nothing or for nominal salaries. In psychiatry, gynecology and obstetrics, moderate salaries are paid to the heads of departments, but only nominal ones to the minor members of the staff." The total

expense for these clinical departments is $141,742 annually. I think it is safe to say that if interest on money invested in buildings and permanent equipment is included, as it should be, the clinical teaching in Johns Hopkins Medical School costs the university $375,000 a year. Everyone of us is glad that her endowment is generous enough to permit such expenditure. There are some schools which report a total annual expenditure for a clinical year of considerably more than $150,000. With this equipment and with a clinical faculty culled from the best medical teachers and research workers in the whole country, Johns Hopkins is teaching clinical medicine and surgery in a way which is very near ideal, certainly as well as it is taught in the United States.

The other example is the school which I know most intimately — the College of Medicine of Syracuse University. This school owned in 1914 no hospital, but had complete affiliation with and indirect control of the staff of two general hospitals, one large special hospital, the municipal hospitals, laboratories and public health equipment, and the county morgue, and it cost the university nothing. We have a modern and most useful college dispensary, which, with equipment, cost $95,000. The laboratories in the various clinics in the dispensary are equipped and supplied by the university. The laboratories in the various affiliated hospitals are largely supported by the hospitals, the university expending not to exceed $200 for this purpose. To educate our students in the care of fine diagnostic instruments, we require them to own a compound microscope of approved pattern and blood counters, and to use them in their clinical work, so that expense is saved. For the laboratories of clinical diagnosis, clinical pathology and clinical bacteriology we expend annually in salaries and supplies $4,836. If the university should charge against us the interest on $95,000 and the cost of upkeep, our total annual expense for clinical teaching would be approximately $10,000. There are reports from a few schools in this group in which the annual expenditure for clinical teaching is less than this.

At the January meeting of the Board of Trustees arrangements were made to secure for the medical college the hospital of the Good Shepherd, a property estimated by an expert accountant to be worth over half a million dollars, and one of the two general hospitals with which we have always been affiliated. It is fervently hoped that an endowment liberal enough to support a modern teaching hospital may be forthcoming from some source, so that we too may inaugurate paid clinical departments. If it does not come, we shall have before us the problem of teaching clinical medicine and surgery in a college-owned and controlled hospital with a volunteer corps of teachers, and of doing it so

well as to meet your approval. My purpose in bringing up this phase of the subject, which seems quite personal, is to pay a tribute to the volunteer teachers of medicine in America. In most of the medical colleges, including those in Class A +, the clinical teachers are unsalaried. In some of them they not only receive no remuneration, but they contribute liberally to the departments over which they preside. In so many instances that the exception is unusual, these teachers are earnest, able, devoted and efficient, and merit our approval. It is much more difficult to conduct a satisfactory clinical course with a large body of volunteer teachers than with a smaller body of picked men who devote all their time to the study and the teaching of medicine, but the experience of schools noted for the high grade of their work proves that it can be done. One dean of an A + school writes: "The amount of money expended does not, by any means, spell efficiency in the conduct of a medical school." I think we shall all agree with that, while at the same time agreeing that in the majority of cases a university does not appropriate as much for the clinical years of its medical school as this Association should consider is the minimum amount for the maintenance of the clinical department of an acceptable medical college.

To make any approximate estimate of what that sum should be, it is necessary to determine first if it be necessary for a college to own the expensive equipment of hospital and a dispensary and clinical laboratories, and then if clinical teachers should be paid, and if so, whether on the basis of full time or part time.

These questions have been so thoroughly discussed for so long a time that any divergence of opinion amongst us to-day cannot be overcome by argument. I have expressed the opinion that it is possible, with a volunteer clinical faculty in affiliated hospitals to do good clinical teaching. But at the same time, I believe that it is not the best way nor the right way. I think that everyone of us who is compelled by force of circumstances to administer a school unable to own clinical equipment or to have a paid clinical faculty is conscious that he is doing so only until the university shall be able to do by clinical medicine what it has always done by every other one of its courses, and that his school is one of many suffering from the left-overs or reminiscences of an early and faulty organization of medical schools. We may conclude, therefore, that a medical school should own and use or control and use a general hospital for medicine, surgery, pediatrics and obstetrics, and a dispensary fully equipped, both for general medicine and surgery, and for surgical and medical specialties, and that both should be fully equipped with clinical laboratory for student use.

The cost of such an equipment will depend on so many differing conditions that an average could not be struck that would be

exact for any one school. A rough estimate may be arrived at by considering the cost per day per patient in a hospital properly equipped for teaching purposes. In the hospital with which I am most familiar, the cost is $1.75 per day. Of this sum, there is paid to the hospital by the city, or by some other responsible party, $1.50, leaving a daily deficiency of a quarter of a dollar per patient, which must be made up from the treasury of the university or by subscription. If we take as a standard hospital one with four units of twenty-four beds each, and suppose that all the beds were occupied 75 per cent. of the time, that would give an annual deficit, representing the cost to the university or to the public over what had been received, of $13,324, which sum is almost exactly the amount of the deficiency in the general hospital with which we are affiliated.

The expense of the dispensary would depend on whether it were financed by the university or by the public. If financed by the public, as it should be, a dispensary which totals 20,000 visits annually should require clinical supplies for its laboratories, which, of course, the university should pay, to the amount of about $1,000.

That medicine and surgery can best be taught by those members of the profession whose skill has received the highest recognition by the profession, and by the people, has been shown to be an error. Whether it shall be proved that they can be best taught by men who receive salaries big enough to relieve them of the necessity of private practice, is now being tried out.

Let us conclude that clinical teaching can be efficiently done by men who are paid enough to permit them to devote sufficient time to the study and teaching of the subject over which each is made professor in chief and who are permitted to engage in consulting practice which does not interfere with their duties as teachers and investigators. The salary for the head of the department should be from $2,500 to $5,000. It would be safe to estimate as a minimum that each major department, medicine, surgery and pediatrics, would require in salaries for the chief assistants and resident physician, $7,500 a year, and that there should be expended on obstetrics and the various specialties at least as much as that, namely, $7,500. That would make a total expenditure for the clinical teachers of $30,000 a year. The total of these approximate sums would, therefore, be $44,324. This is so nearly the $50,000 which it has been estimated was necessary for the conduct of the clinical department of a first-class medical school, that it is quite significant.

Necessity has compelled the administrative officers of some medical schools to estimate the value of clinical services in a purely mathematical and utilitarian way. For example, the former dean of a school in Class A told me that he arrived at the pay

for clinical teaching in this way: He ascertained what money value the desired practitioner put upon his time by the hour, multiplied that by the number of hours he would be asked to serve in the school year and divided that sum by two, because, he said, the practitioner who would be asked to serve as a clinical teacher must necessarily have an hospital appointment and would voluntarily and in order to carry on his service, render as much as half of the service that would be required of him for teaching purposes. Perhaps we shall be obliged to make use of some such method in determining the salaries of clinical teachers in the beginning, but let us hope that the majority of medical schools, as well as the favored minority, may soon have their necessities met by an endowment liberal enough to pay adequately those who devote themselves to clinical teaching.

THE PRESENT RELATIONS BETWEEN THE COLLEGE AND THE MEDICAL SCHOOL

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The inclusion of the so-called medical laboratory sciences within the college curriculum so that a bachelor's degree is conferred upon a candidate who has completed from two to three years of college work and from one to two years of the medical laboratory sciences marks the trend in modern medical education. Those directly concerned with medical education unanimously favor this arrangement, as it places medicine upon a much higher level. Those concerned with college education and administration on the other hand are not agreed in the matter. While many have welcomed this affiliation, some have looked upon the whole procedure with grave concern, and others have been hostile in their attitude toward it, characterizing it as a dangerous and alarming tendency. In many instances this enmity on the part of the college dean and college administration toward the initiation and maintenance of anatomy with its microscopic sciences, physiology, biochemistry, pathology, bacteriology and other medical laboratory sciences, has been so pronounced that it has been impossible for the medical school to attain its desired ends.

Interesting replies were received to a circular letter, sent to the college medical deans in institutions where this combination of courses is either already maintained or in the process of adoption, containing queries regarding the methods of administration where the two schools are concerned, the plans for administration where affiliation is being effected, and the nature of the college degrees conferred for the combined course. The objections advanced by some of the college men are indeed not without foundation. And the purpose of this paper is to consider some of these objections and to present a plan for the affiliation and administration of the combined courses. Especially to those concerned with the college side of the administration is this paper directed and for this reason a brief summary of the conditions as they are will, I hope, not be out of place.

MODERN TREND IN MEDICAL EDUCATION

The mutation from the old proprietary medical school to the university medical school has necessarily been associated with

numerous difficulties in adjustment. Like all mutations adaptation to environment is a serious problem with the mutant. Congruence of the two can only be attained after a long period of contact and attempts at adaptation.

By the use of the term university medical school reference is made to those which are departments or divisions of universities either by inception, in which case harmony is complete, or by affiliation and amalgamation. The latter condition, as is well known, is the result of heroic and commendable efforts of many proprietary medical schools to survive the fatal epidemic that is attacking and destroying them. The passing away of the old time proprietary school, generally initiated as it was primarily for the personal aggrandizement of the proprietors, and the assumption by the university of medical instruction marks one of the greatest epochs in higher education in recent years.

Many factors have been responsible for this desirable transition and rebirth. The birth of a number of new sciences consequent upon the invention and application of the microscope — such as histology, embryology, neurology, bacteriology and pathology. Associated with the development of these sciences was the demand for specially trained men working in expensively equipped laboratories. The other medical sciences such as physiology, pharmacology and physiological chemistry likewise, as a result of new discoveries and higher teaching aims, exacted trained men and costly facilities.

With the advent and development of these sciences a better preliminary education on the part of the student was imperative. Where formerly, because of the keen competition for students between the proprietary schools and the nature of the course, intelligent reading was practically the only requirement for entrance, now a preliminary training in chemistry, physics, biology and languages is essential — a training that is the equivalent of at least from one to two years of college work. It is through the close relation that this preliminary training as well as the medical laboratory sciences named bear to college education that the college and medical school have been brought into such close relation.

The college, too, must be given much credit for medical education reform. In many colleges some medical laboratory sciences such as physiology, anatomy, histology, embryology, neurology and bacteriology were initiated and developed, and for these college credit was readily given. It was found that those who had taken these subjects in the college were often far better trained than those who had taken them in proprietary schools.

Other factors responsible for raising the standards of medical teaching were the high demands made by certain benefactors. The Carnegie Foundation and the Rockefeller Foundation have had and are having a tremendous and wholesome influence. The

Association of American Medical Colleges and the Council on Medical Education of the American Medical Association are probably responsible for the greatest direct influence.

PRESENT STATUS OF THE COLLEGE AND MEDICAL SCHOOL

Where formerly more than one hundred and fifty proprietary medical schools existed the number has now fallen below one hundred, and there is every indication that the reduction will continue. Only those medical schools that are directly well endowed or are a part of or closely affiliated with generously financed universities or colleges can survive. The increased demands for higher standards in medical education and the high cost of instruction in the various sciences concerned together have driven the medical school back to its legitimate and historic home — the university. More than fifty medical schools at the present time are connected with universities either through birth, complete amalgamation or affiliation. Those which cannot bring about this desired association must perish. It is in those institutions where the medical school is the result of revolution rather than evolution that the greatest difficulties have arisen both in the initiation and administration of these sciences.

VIEWS HELD BY MEDICAL EDUCATORS

Those concerned with medical education maintain that the various medical laboratory sciences scientifically taught have a culture value equal to that of any of the other sciences included by the college in its baccalaureate curriculum, and consequently should be accepted along with the regular biological and physical sciences for the bachelor's degree. The consideration of these sciences as sciences and not merely as a means to an end has been found to bring the most desirable results. The appreciation of this fact is unquestionably responsible for the great progress now being made in American medicine.

They further contend that after from two to three years of so-called cultural college work distributed generally so as to meet group requirements a student enters the so-called medical sciences with a renewed or awakened interest, since he is now directly concerned with his life work. With this added impetus naturally a student will achieve more than when more or less aimlessly studying a science.

The majority of medical educators hold that after two years of properly grouped college work the medical laboratory sciences should follow since, after a considerable acquaintance with the so-called cultural studies the student begins definite work along the lines of his chosen profession at an age of maximum mental and physical flexibility.

The great advantage to be derived from intimate association with all the varied interests of the college and university, and many other reasons are advanced by medical men for favoring this combination. Time, however, will not permit of a consideration of them.

THE COLLEGE POINT OF VIEW

As heretofore stated the attitude of college men is variable. Many favor the present trend. "It seems to me that the test whether any work is of such character as would be accepted for credit toward a bachelor's degree is in the character of the course," remarks one dean. "I regard all the subjects mentioned except pharmacology and materia medica as cultural courses," say several. "The cultural value of some medical studies we recognize." "Histology, anatomy, embryology, physiology, chemistry, bacteriology and pathology are considered proper subjects to count toward the bachelor's degree." These are some of the favorable responses to my inquiry. Most of the answers, however, stated only the existing conditions and no opinions were given.

That personality plays an important part may be seen from the following quotations: "The dean of the college and I are in perfect accord regarding . . ." "With reasonable deans there is no danger of friction." "Might I add that we have no trouble in adjusting the combination, among other reasons because the secretary for the first two years is so delightful and reasonable in all of these arrangements." "With the dean (of the medical school) now in charge this is safe."

On the other hand, opposition to this plan is pronounced in some instances. Note the following comments: "I was opposed to the whole business," remarks one prominent dean speaking of this combination which had been effected in his school. Another when asked if he favored the plan said, "No, I do not. There may be exceptional cases where such lines of work would be suitable for a baccalaureate degree, but the circumstances would have to be very peculiar to make any of these subjects suitable for liberal arts." One of the best arguments advanced against this combination is by a very prominent and highly efficient dean who states: "The whole matter turns upon the demand — presumably legitimate — of the medical school that its general scientific courses shall be made professional in purpose and character, and on the other hand the unwillingness of the college to offer such courses." In no wise, as far as I can learn, does this particular dean question the educational value of these sciences. He only suspects that they will assume a professional character upon transference to the medical school. It happens that in this particular institution some of the medical laboratory sciences had

been initiated in the college long before the establishment of the medical school. With the founding of the latter, pressed by the medical standardization agencies, demands were made upon this college to transfer these sciences to the medical school. Under such conditions is not the college justified in its suspicion that the sciences would assume a professional aspect?

The numerous comments and objections of college deans may be summarized as follows: (1) traditionally bad instruction characteristic of professional schools; (2) non-cultural aspect of professional studies; (3) difficulties concerned with the administration of the combined courses; (4) personalities.

TRADITIONALLY BAD INSTRUCTION CHARACTERISTIC OF PROFESSIONAL SCHOOLS

The college is justified to a great extent in its antagonistic attitude towards the acceptance of professional courses thrust upon it. The history of the professional school in America — its origin, its purpose, its administration, its method of instruction — is not, to say the least, commendable, but, on the contrary, bad. Speaking of medical sciences in particular the methods used in instruction even within the past decade possessed but little that the college could readily accept as the equivalent in real educational worth of the scientific courses it offered. Anatomy, for example, was considered with the chief idea of preparing the student for surgery — For an appendectomy make the incision here, characterized its teaching. Similarly physiology, physiological chemistry, bacteriology and pathology were conducted to acquaint the prospective physician with such fundamentals as would facilitate the work later on in diagnosis and therapeutics.

Within recent years, however, owing to the various factors already enumerated, a complete revolution in the aims and methods of teaching these sciences has taken place. Perhaps the most beneficial factor responsible for placing professional education on a higher plane is the conception that every science making up the medical curriculum should be considered as an independent science as well as a related science. And in the application of this concept the most scientific methods of study must follow. This requires well equipped laboratories; two years of preliminary college work, on the part of the student, including biology, physics, chemistry and German; and, on the part of the teacher, a training equal to that required of a Ph.D. in our best universities. If the medical laboratory sciences are conducted under these conditions no one, I believe, even the most conservative college dean, can question our claim that they have an educational value equal in every respect to the sciences offered in the college curriculum.

CULTURAL ASPECT OF PROFESSIONAL COURSES?

No term is debated more in pedagogy or understood less and at greater variance than this mystical ever changing term culture. De Garmo's definition seems a good one — "Culture is a product of insight — a total refining effect — intellectual, emotional and volitional produced by insight into what is learned." Elliot's measure of a cultivated man is apparently an appropriate standard. According to him he must be a man of character; he should express himself by tongue or pen with some accuracy and elegance; he should have a general knowledge of many things and a real mastery of some small portion of the human store of knowledge; he should have a training in constructive imagination. Apply these criteria in a broad sense and a cultivated man must be the result no matter what his specialty is. To acclaim that that which I have pursued with its associated refinement and pleasure alone is culture is the most inexcusable form of bigotry. Culture is the desired reaction that the thing intellectually pursued has upon the pursuer. The subject itself in no wise can determine culture. Of course, in general there is a relative clulture value as regards the subjects pursued. Under equal conditions more culture is to be derived from the study of German than Spanish. Although one who has studied the latter may have derived far more culture than another who has pursued the former.

Do the various medical laboratory sciences carry with them a cultural value? One who has earnestly and enthusiastically studied anatomy, physiology, biochemistry, bacteriology and pathology under modern conditions alone can appreciate their refining influence that must be interpreted as culture of a high degree. Further, this culture has a relative value equal to that of any other physical or biological science, and none but the most chauvinistic humanist at this day would question the cultural value of sciences.

The time is not far distant when the introduction of the biological sciences into the college baccalaureate curriculum was met with pronounced disapproval on the part of the college reactionist. What cultural value can be attached to the study of the detestable earth worm? was asked with derision. Yet the results of this very study have culminated in the greatest influence upon the thought of modern civilization — evolution. Can one, after all, differentiate between the thought of an age and its culture? Is not the latter a reflection of the former? To-day we think in terms of evolution. We speak in terms of evolution. Every phase of knowledge now has its evolutionary aspect. In fact, culture itself does not escape this method of consideration. If a conception of the principles of evolution is to be regarded as of great cultural value, then assuredly many of the medical labora-

tory sciences stand among the most available approaches to this realization.

The cultural value of a subject depends greatly upon the intensity to which it is pursued. The more one knows regarding a particular subject the greater is the insight with its associated refining effects. Now are not the laboratory medical sciences simply biological specialties? Is not the consideration of these sciences a continuation of the study of biology?

Before passing judgment on the culture value of these sciences it would be well to examine in more or less detail the modern methods of their presentation and study.

Referring to anatomy — in the first place the teacher is generally the product of both extensive and intensive training. He has a college education and in addition has devoted several years to advanced work in science, usually leading to the degree of Doctor of Philosophy. This training has consisted of invertebrate and vertebrate zoology—both gross and microscopic, embryology and phylogeny, the latter through comparative anatomy and paleontology. Of course, these represent his major work. His minor work has usually included certain kindred sciences such as physiology. No one familiar with the average training required of a Ph.D. candidate in our better institutions will question the breadth or efficacy of his training either from the standpoint of the intellectual or cultural. A training of this sort necessarily determines a man of culture. The student of anatomy with whom the teacher deals has a good groundwork in biological training for he has already completed certain prescribed preliminary courses in biology. He soon realizes that the study of the structure of man is the culmination of morphological study, for is not man the most interesting and important product of evolution? It is then from the standpoint of evolution that the study of the structure of man is taken up.

A department of anatomy includes the following sciences — osteology; human dissection, which is generally termed gross anatomy; histology; embryology, and neurology.

Osteology — which treats of bones, offers the best opportunities for the realization of evolution along the lines of paleontology. The bones of man are compared and contrasted with those of the other vertebrate forms. The variations and progressions are considered along with the theories of those silent forces responsible for these changes. The bones of man contain many structures that are explicable only in the science of paleontology and geology. One finds in the proper study of osteology a most vital appreciation of man's descent, of his relations to the vast fauna that have gone before leaving their records in the various strata of the earth. Is this then not a culture study?

Dissection of the human body.—The dissection of the human body is no longer considered as a subservient to surgery. On the other hand it now represents a culminal phase — a most essential part — of the study of comparative anatomy. None can claim proficiency in comparative anatomy unless he is familiar with human anatomy. The converse also is true, for to study human anatomy without a knowledge of other simpler forms of vertebrate life is irrational.

Histology—the study of cells, their internal structures, their specializations and arrangements to form the various organs and structures of the body—is but a continuation of previous microscopic study. After all, what subject has a greater educational value than this—the study of many of the fundamental life processes as revealed by means of the microscope? Human histology bears the same relation to the general microscopic field of study as gross anatomy bears to the macroscopic phase of zoology. It has its comparative phase. The factors of organic evolution are continually reviewed. The study of life itself is inseparably linked with histology.

Neurology—another aspect of both gross and microscopic anatomy—has been received into the college curriculum with much less reluctance than the other anatomical sciences. Its direct relation to psychology and its indirect relation to philosophy are responsible to a great extent for this attitude. To recount the culture value of neurology is unnecessary. The study of the mind, based on a knowledge of the structure of the organs through which it functions is one of the most important phases of study. The complex structures of the human brain are being solved in the study of the simpler forms of life. Hence comparative anatomy and phylogeny again are reverted to. Likewise embryology must explain these intricate structures. Thus a knowledge of these sciences is again essential. Neurology is also of vital interest to the anthropologist, ethnologist and educationalist. Pseudosciences, such as phrenology, have arisen for want of a better understanding of it. It appeals to so many phases of knowledge. No one, I am sure, can question its value—educational or cultural.

Embryology.—Embryology is unquestionably one of the most important subjects in the entire biological curriculum. The development of the whole individual from one single fertilized cell is here considered, and as a consequence the various facts and theories regarding life processes must be repeated. It is in embryology that one first comprehends the great truth that life is everlasting. So long as a species survives the germ cells never perish. Only the somatic cells of each individual decay and pass away when they have performed their sole and only function. The whole history of life, from away back in the early Palaezoic to the present—millions upon millions of years' duration—is

quickly summarized kinetoscopic like. Thus the familiar apothegm—"Ontogeny recapitulates phylogeny"—has had its origin. Even sociology with its anthropology and ethnology, the study of education, and in fact every aspect of knowledge concerned with the study of man have embraced this aphorism and applied it to post-natal development—the evolution of civilization is recapituated in the development of the child. Thus embryology is closely interrelated with a great many phases of learning.

Anatomy, then, with its various subdivisions considered, forms the foundation study of life, its nature, its origin—both individually and phylogenetically, its relation to other life forms, its preservation, its purpose, its future. And have not these very problems been the fundamentals in all education?

The teachers in the other medical laboratory sciences have had trainings characteristic of that outlined for the teacher of anatomy.

Physiology—a sequel to the study of structure, a consideration of life's various functions, is a most important and cultural science. Like anatomy, may complex functions of human physiology have been and are being interpreted by the study of other vertebrate forms. Thus a recapitulation of practically all the biological sciences is essential. In recent years it has welcomed into its fold at least an important portion of one of its subdivisions that for want of true appreciation had been placed elsewhere — psychology, the fundamentals of which are now considered as the physiology of the nervous system. No one questions or can question its place in the college curriculum.

Physiological chemistry is another science for which college recognition is sought. No serious objections can be advanced toward this science. It presupposes a training in general inorganic chemistry, qualitative analysis, and general organic chemistry. A knowledge of biology—both comparative anatomy and embryology—is essential also. For to understand the chemical structure of the more complex living organs approach must be made through simpler life forms. Thus physiological chemistry is closely interrelated with these other sciences and what has been claimed for them is also true for it.

Bacteriology bears much the same relation to botany that the study of protozoa maintains to zoology. It is a specialty of botany. Appreciation of its true value depends upon a number of preliminary courses in botany and zoology. Its culture value cannot be questioned any more than that of botany itself. The relation of bacteria to man is only an ecological phase of this science. The tissues of man, then, are only environments in which certain bacteria under special conditions flourish. The scientific method in the study of bacteria is to consider their nature —morphology and chemical structure—relation to other life

forms, distribution, classification, origin, growth, ecology, metabolism, excretion, the effects of the products of the latter, and so on —the same methods employed in the consideration of any biological science. In this way only can one appreciate fully the science of bacteriology. No longer does an unskilled self-styled professor explain that "this is the *Bacillus typhosus,* which causes typhoid fever." "This is the tubercle bacillus—it causes tuberculosis," etc. Of course, no educational value could be ascribed to such a method of presentation.

For the other medical laboratory sciences—pathology, pharmacology and materia medica, much doubt has been expressed by college deans as to whether general college credit should be given. The majority deem these purely professional courses. Even some medical educators agree to this. It depends much on the character of the work, of course. The three are closely related as they deal with abnormal body conditions. All require a knowledge of the other medical laboratory sciences with which they are closely interrelated. Pathology and pharmacology have been greatly advanced as a result of comparative biological study. Hence a knowledge of life structures, processes and those factors concerned in evolution are essential. Thus a cultural value can be attached to them.

Individually and collectively, then, the so-termed medical laboratory sciences possess high degrees of culture value, and it is opportune to state here that no other group of studies require for their true appreciation greater training—both extensive and intensive. At the very beginning one finds that a reading knowledge of German and French is highly desirable if not indispensable. Visit the libraries of any of these departments and it will be found that at least three-fourths of all the books and current periodicals are written in foreign languages. The nomenclature as it is now, built upon Latin and Greek, requires some knowledge of the ancient languages. Numerous written descriptions of laboratory experiments certainly demand exact expression—hence English comes continually into use. With all these qualifications now exacted of a student going into medicine, can the culture value of his work be questioned?

In the last analysis, with a great many culturists, a professional course is one that directly trains an individual to make money, while a cultural course has no such motive in view. It may be well to state here that an individual who has completed the laboratory sciences is in no way more directly trained to earn a livelihood than the other college graduate who has followed the general curriculum. In no manner are the laboratory sciences professional in this respect.

Acquiescence, at least, on the part of many collegians is gained when they learn of the scientific method of presenting the medi-

cal laboratory sciences. The following questions, however, are frequently asked:

Of what value to the professional man is such emphasis on the scientific aspects of these laboratory sciences?

Is there not danger of the teacher in the professional departments emphasizing the generally accepted "practical" method of teaching to the detriment of the scientific method?

Why, then, have a medical school organization in the university? Is not the college organization sufficient to supervise these courses?

To the first question our reply is that the scientific method of presentation is the only correct one. The recent progress in medicine has been due to this aspect of teaching. Not until man was placed as a result of comparative study in his proper niche in the animal realm was the true nature of his tissues appreciated. The conception of his structure, his physiology, the abnormal functions which develop in the course of life, and the treatment of the same have been attained through the study of comparative anatomy, comparative physiology, comparative pathology and comparative pharmacology. He who possesses the most exact knowledge of the cell — which can be attained only through scientific biological, chemical and physical study — assuredly is best fitted to deal with it. Again, there are so many disorders both inherited and acquired that are directly concerned with phylogeny. The appendix, tonsils, thyreoglossal duct and numerous reversional and atavistic structures and conditions with which medicine has to deal are only appreciated in their true light by a thorough knowledge of phylogeny. It is now generally accepted that those structures in man which are phylogenetically retrogressive show a marked predilection to infection. The highest attainments in medicine then are directly related to a thorough knowledge of biology, chemistry and physics. This triumverate of sciences is the very foundation of medicine in all its various phases — in its practice, in its research, in its teaching. And none appreciates more the necessity of a mastery of these sciences than does the efficient physician. That old platitude differentiating between the scientific man and practical man has no foundation. For is it not the most scientific man — he who knows the most — who, in the last analysis, is the most practical?

To the second question — the emphasis of the practical to the depreciation of the scientific — my reply is that such is impossible with teachers of thorough training. They above all others appreciate the absolute necessity of first grounding the students in the scientific fundamentals of every subject. Only by this method can the desired results be obtained. Clinical medicine is to a great extent applied knowledge of these laboratory sciences. Generally, he who has had the most vigorous scientific training in the latter

must of necessity be the most successful in its application. The modern teacher is aware of this fact. However, he will not refrain from developing and intensifying the interest of the student in these sciences by repeatedly showing the application of certain scientific principles learned. Frequently concurrent lectures accompany these sciences for the purpose of demonstrating the practical value of the scientific knowledge gained. Is not this same method reverted to in most lines of teaching? Does it not make the very science itself more interesting?

If the medical laboratory sciences then are broad sciences for which college credit should be given, why have a medical dean concerned in the administration? Is not the college dean sufficient? A medical school organization is as imperative as a college organization. It is composed of a number of closely interrelated sciences arranged in proper sequence so that one follows another in a natural order. Consequently those who teach and administer the medical sciences must appreciate the end in view in medical education. They must be sufficiently aware of the interrelation, the natural order, the purpose of all courses making up the curriculum. This knowledge, however, does not detract in any way from the scientific value.

Also, the laws governing the licentiating of physicians demand in most states that the candidate shall have attended a medical school for four years.

PERSONALITY

Some of the quotations under "the attitude of the college" show the far-reaching influence that personality plays in all administration work. Where friction is least and the mechanism of the combination works best it is invariably "the dean is a fine broad-minded fellow." And it is only reasonable that such be the case. The combined courses have a two-fold function and consequently demand two administrational forces. One, the college, which must control the courses for which credit is given toward a baccalaureate degree; the other, the medical school, which must control the medical curriculum.

One great difficulty with this combination is the rather autocratic powers that deans in many institutions possess. Not only is this power concerned with the courses making up a particular curriculum, but it also dominates the personnel of the departments giving courses in the particular curriculum. Thus the dean not only controls to a great extent the subjects taught, but also the teachers. He is in sort a sub-president, not only responsible for the nature of the curriculum, but also for the appointments and promotions of the teachers. Naturally he is most zealous for his school, very anxious indeed to see it grow and flourish. These are commendable qualities, but they lead to serious friction at

points where interlocking occurs, and there is any question as to who is to control the courses and teachers of these fusion departments. Prerogatives are at issue and unless broad-minded deans are officiating there is trouble. Deans under these conditions must of necessity be thoroughly in sympathy with both phases of the purposes which these courses serve. Their interests must conjointly include the welfare of both schools. They should be in frequent consultation regarding the character of these courses and the personnel of the teaching staff. Only by such conditions can friction be avoided. As a consequence of independent administration many institutions duplicate instruction. Two departments are in competitive existence where one would serve both purposes. Imagine the waste under such conditions.

Reference is made to these conditions not for criticism, but only to call attention to one of the causes for the difficulties concerned in the administration of combined courses. Far less difficulty is likely to occur in universities where the function of the dean is concerned with the student and the courses making up the curriculum. In many institutions the dean concerns himself chiefly with the welfare of the student. It is he who represents the students before the corporate faculty and at the same time insures the faculty that the student has complied with all the regulations laid down by it. The department is responsible only to the president of the university. The personnel of the department is subject to an appointed head or committee, and they to the president. The dean only concerns himself with the teaching staff indirectly or as he is consulted by the president or department. These departments serve the various schools as the demands are made upon them for instruction. Little friction can occur as the departments are represented in many schools. Is this not the ideal arrangement in large universities? Cannot one teacher appreciate the aims of the various schools? Is it not a much sounder policy to have departments serve the various interests of the university than to be isolated and restricted to one particular school?

THE SMALL COLLEGE AND THE MEDICAL SCHOOL

Numerous small colleges exist in more or less isolated localities some distances from medical schools. Complaint has frequently been made by these institutions that the medical schools take the student away from the college at the end of his sophomore or junior year. Accordingly, the small college is depleted, and criticisms are directed toward medical and other professional schools because of this drain. Facts, however, show that the small college is benefited far more than injured. For it is this very medical requirement — that students must have two years of pre-

liminary college work — that compels many to matriculate in the small college who otherwise would not have done so.

Controvention to this plan of combined courses on the part of the small college is one of the great factors responsible for the present fate it is meeting — for all know of the heroic struggles of many of these institutions for existence. The particular factor to which I refer is the unnecessary loss of alumni. The value to an institution of an active alumni is universally appreciated, and there is no reason why those who go away from the college at the end of the second or third year should not be made alumni after having completed the medical laboratory sciences in some good medical school. Consequently a much sounder attitude for the small college to assume is to recognize this forceful trend in modern education. It should be especially keen to affiliate with some strong medical school and then confer its bachelor's degree after the medical laboratory sciences have been completed. Numerous small colleges may have this relation with one strong medical school. Why should not the colleges manifest as much desire to include in its alumni desirable students who have efficiently completed work of the freshman and sophomore years as those who have matriculated for only the senior year. Generally it is that institution with which a student is registered for the senior year that confers the bachelor's degree and thus includes him as an alumnus. Not only do students leave the small college in order to enter courses leading to a profession, but there is a tendency for them to enter later in their college careers larger institutions. These tendencies are characteristic of the present and necessarily the small college suffers. A remedy can be effectively applied by following up these migratory students and after they have completed the requirements of the college and with the student's permission, who is usually anxious, confer the degree. Thus a strong alumni can be maintained even in small colleges.

It is only fair to invite the college to rigidly inspect the various medical laboratory sciences for which college credit is sought. Should it feel so inclined a committee from the college should be appointed for the purpose of inspecting the aims and methods of teaching these sciences. The college has a right to insist that the work be conducted along scientific lines. I feel sure that teachers of the medical laboratory sciences will welcome such inspection and will gladly explain their methods of instruction. The college will not object, I believe, to certain auxillary lectures and demonstrations that may accompany these various sciences for the purpose of calling the student's attention to their practical phases. The assurrance the college desires is that these courses are taught primarily as sciences. A committee of this sort is especially desirable in those institutions where a cleavage exists between

the various faculties. For there are universities in our country wherein the professors of anatomy, physiology, pathology, etc., never sit in college faculty deliberations. It is in these institutions that much misunderstanding, intolerance, and lack of sympathy for the professional school is manifest. A committee of representative collegians would certainly accomplish much in effecting a harmonious union. Better understanding of the aims and methods of professional teaching would necessarily result. Where departments sit in both faculties such a procedure is unnecessary.

The small college, likewise, should investigate the character of the work in the medical institutions to which their students go for the junior and senior years upon whom it exjects to confer a bachelor's degree on the completion of the laboratory sciences.

Medical schools, on the other hand, should recognize and encourage work done in the college bearing directly upon any of the medical laboratory sciences. Frequently students enter medical schools already considerably advanced in such sciences as histology, embryology, bacteriology, etc. Due credit should be allowed for work equivalent to its courses and the student be permitted to do advanced work along these lines instead of repeating the course. The educational value of well conducted original work on the part of a student is much greater than that of regular class instruction.

PLAN OF ORGANIZATION

Curricula.—The present trend in the organization of the combined courses is to arrange two curricula, one leading to the degrees of S.B. and M.D. in six years of study; the other, to the degrees of A.B. and M.D. in seven years. In the majority of institutions where the combination is effected this plan is followed and in institutions where the combination is in the process of formation it is being adopted. Many, however, maintain the first curriculum only — that leading to the S.B. and M.D. degrees. Others have the second — the A.B. and M.D. Only a very few grant the A.B.-M.D. degrees for two college and two medical years, and this number is decreasing.

Conferring of degrees.—In a large majority of the institutions the bachelor's degree is conferred by the college. In some few institutions the university as a whole confers the degree. In no instance so far as I know does the medical school grant it. The degree is conferred at the end of four years. In case of the S.B. curriculum it is conferred on the completion of two years in the college and two years in the medical laboratory sciences. In the A.B. curriculum it is conferred after three years in the college and one year in the medical laboratory sciences.

Nature of the S.B. degree.—Much difference of opinion exists as to the nature of this degree. In most instances the pure Bachelor of Science is conferred. Colleges are realizing more and more that the medical laboratory sciences are fully equivalent in every respect to the general college sciences and consequently a regular science degree is given. This marks the trend. Some few institutions append to the S.B. degree the phrase "in medicine." Others place a footnote on the diploma stating that the degree is given for the combined courses.

Nature of the A.B. degree. The A.B. degree, granted for three years in college and one year in medicine, is, so far as I know, a pure degree without any explanatory appendix. This is due to the fact that in most institutions at least thirty hours of elective work is permitted candidates for this degree.

In accordance with this trend in the organization and administration of the combined courses, this plan may be submitted where combination is desired.

1. The college and medical school would grant the degrees of S.B.-M.D. for six years of study, and the degrees of A.B.-M.D. for seven years. The bachelor's degree would be conferred by the college at the end of four years — in case of the S.B. degree, on the completion of the freshman and sophomore years in the college and the first two years in the medical laboratory sciences; in case of the A.B., after the completion of the freshman, sophomore and junior years in the college and the first year in the medical laboratory sciences.

2. The high school entrance requirements to these curricula would be the same as those required for admission to the college.

3. The curriculum of the freshman and sophomore years in case of the S.B.-M.D. (a minimum of sixty hours) and the curriculum of the freshman, sophomore and junior years in case of the A.B.-M.D. course (a minimum of ninety hours) would be conducted by the college.

4. In order that students shall avail themselves of the essential courses directly preparatory to the study of medicine and to meet the requirements laid down by the American Medical Association and the Association of American Medical Colleges, the above college curricula must include the following courses:

(a) A minimum ten hours of general inorganic chemistry, providing, of course, that organic chemistry is included in the first year of the medical curriculum. Otherwise at least five additional hours of organic chemistry must be included within this minimum. All students are strongly advised to take both qualitative and quantitative analysis.

(b) A minimum of from eight to ten hours of physics, five hours of which must be of college grade. Students are advised to complete courses in the college covering mechanics, sound,

light, heat and electricity. Generally, ten hours of college physics are necessary to cover these.

(c) A minimum of from eight to ten hours of general biology. These courses must include the general principles of animal life, invertebrate and vertebrate morphology. Courses in plant histology also are desirable.

(d) A minimum of from eight to ten hours of modern language, preferably German. From fifteen to twenty hours of German and ten hours of French are highly recommended.

The minimum hours required as a rule readily fit in with the group requirements of the college. The recommended work, of course, would be determined to a great extent by the previous high school training and the group requirements of the college which must be fulfilled.

5. Students would be admitted to the medical courses upon presentation of a certificate from the dean of the college stating that the entrance requirements to the medical school had been fulfilled, or a recommendation that the student be admitted with certain conditions. (These conditions should not exceed five or six hours and should be removed in the following summer school.)

It may be found more feasible for the dean of the medical school to determine whether the entrance requirements to the medical school have been fulfilled.

6. The curriculum of the junior and senior years of the S.B.-M.D. course would be composed of the following:

JUNIOR YEAR

First Semester.—Organic chemistry, anatomy, osteology and dissection, histology.

Second Semester.—Physiological chemistry, dissection, embryology, neurology.

These courses would constitute the senior year of the A.B. course in the A.B.-M.D. combination.

SENIOR YEAR

First Semester.—Physiology, bacteriology, anatomy.

Second Semester.—Physiology, pharmacology, pathology.

Of course it is impossible to outline in detail the courses making up the junior and senior years that would be found suitable for all schools. In many instances organic chemistry is required for entrance to the medical laboratory sciences. Again, the courses vary with different schools. It is well, however, to state these courses and the number of hours' credit that will be allowed in drawing up a plan with the college.

7. After the completion of these courses in the medical school a certificate to this effect would be sent to the dean of the college, and the bachelor's degree could be granted at the next regular convocation.

The small college likewise should draw up a similar plan with the state university or some other institution where the laboratory medical sciences are taught in accordance with the latest scientific methods.

With a plan of this sort agreed to by both little friction ought to result in the administration of these courses.

Minutes of the Twenty-Fifth Annual Meeting, Held at Chicago, February 17, 1915, Under the Presidency of Dr. Isadore Dyer, Tulane University School of Medicine

MORNING SESSION

Joint meeting with the Federation of State Medical Boards.

Dr. Dyer and Dr. George W. Cook, president of the federation, presiding. The delegates and visitors assembled in the Florentine Room of the Congress Hotel at 9:30 o'clock.

President Dyer welcomed the assembled delegates and visitors and introduced the officers of the Federation, Dr. George Cook, president, and Dr. O. V. Huffman, secretary.

Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching, then read a paper entitled "Classification of Medical Colleges," which was discussed by Drs. N. P. Colwell, A. D. Bevan, G. H. Matson, J. M. Baldy, H. D. Arnold, J. W. Holland, and, in closing, by the essayist.

Dr. Major G. Seelig, St. Louis, followed with a paper entitled "Fallacies in the Argument Against Full-Time Clinical Instructors." This paper was discussed by Drs. Wm. H. Welch, W. L. Bierring and A. D. Bevan.

Dr. F. C. Waite, Cleveland, then discussed the "Minimum Expense of Maintenance of an Acceptable Medical College, (a) Laboratory Department."

Dr. John L. Heffron, Syracuse, N. Y., took up the "(b) Clinical Department."

At this juncture, Dr. Dyer appointed the following Nominating Committee: Drs. I. S. Cutter, William Pepper and L. E. Burch.

An adjournment was then taken until two o'clock.

AFTERNOON SESSION

The delegates and accredited representatives to the meeting assembled in the Congress Hotel, and were called to order by President Dyer at 2:00 p. m.

ROLL CALL

The roll call showed that forty-nine colleges in membership were represented by delegates, as follows:

University of Alabama School of Medicine. — W. F. R. Phillips.

Leland Stanford Junior University Department of Medicine. —Wm. F. Snow.

University of California Medical Department.—Wm. Palmer Lucas.

University of Colorado School of Medicine.—Wm. P. Harlow.

Yale Medical School.—George Blumer.

Georgetown University School of Medicine. — George M. Kober.

George Washington University Department of Medicine.— F. A. Hornaday.

Howard University School of Medicine.—Edw. A. Balloch.

Northwestern University Medical School. — Arthur R. Edwards.

Rush Medical College.—John M. Dodson.

University of Illinois College of Medicine.—D. A. K. Steele.

Indiana University School of Medicine.—Chas. P. Emerson.

State University of Iowa College of Medicine.—L. W. Dean.

University of Kansas School of Medicine.—John Sundwall.

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

Tulane University, Louisiana, School of Medicine.—Isadore Dyer.

College of Physicians and Surgeons, Baltimore.—Wm. F. Lockwood.

Johns Hopkins University Medical Department. — Wm. H. Welch.

University of Maryland School of Medicine. — R. Dorsey Coale.

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

Tufts College Medical School.—Charles F. Painter.

Detroit College of Medicine and Surgery.—Frank B. Walker.

University of Michigan Medical School.—Chas. W. Edmunds.

University of Minnesota Medical School.—E. P. Lyon.

University of Mississippi Medical Department. — W. S. Leathers.

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

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

Washington University Medical School.—Eugene L. Opie.

John A. Creighton Medical College.—A. L. Muirhead.

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

Columbia University College of Physicians and Surgeons.— Samuel W. Lambert.

Cornell University Medical College.—W. M. Polk.

Syracuse University College of Medicine.—John L. Heffron.

University of Buffalo Medical Department.—H. U. Williams.

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

Ohio State University College of Medicine. — William J. Means.

University of Cincinnati College of Medicine. — Paul G. Woolley.

Western Reserve University School of Medicine. — F. C. Waite.

State University of Oklahoma School of Medicine.—Curtis R. Day.

University of Pennsylvania Department of Medicine.—Wm. Pepper.

University of Pittsburgh School of Medicine.—Wm. Charles White.

Hahnemann Medical College and Hospital.—John J. Tuller.

Vanderbilt University Medical Department.—L. E. Burch.

University of Texas Department of Medicine.—William S. Carter.

University of Utah School of Medicine.—Perry G. Snow.

University of Vermont College of Medicine.—H. C. Tinkham.

Medical College of Virginia.—Alfred L. Gray.

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

Meharry Medical College.—George W. Hubbard.

VISITORS

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

Harvard University Graduate School of Medicine.—H. D. Arnold.

New York Homeopathic Medical College.—Royal S. Copeland.

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

Leonard Medical College.—Charles F. Meserve.

Jefferson Medical College.—James W. Holland.

Medico-Chirurgical College of Philadelphia.—Wm. L. Rodman.

Woman's Medical College of Pennsylvania.—Clara Marshall.

Marquette University School of Medicine.—J. Van de Erve, C. B. Moulinier, Henry C. Tracy and L. F. Jermain.

Medical College State of South Carolina.—Robert Wilson, Jr.

University of Tennessee College of Medicine.—Brown Ayres, Herbert T. Brooks and S. T. Moreland.

Fordham School of Medicine.—Wm. P. Healy and Alexander Nicoll.

College of Medical Evangelists, Loma Linda, Cal.—Newton Evans and P. T. Magan.

Hahnemann Medical College, Chicago.—Jos. P. Cobb.

Loyola University, Chicago.—H. J. Spalding and M. Herzog.
School of Homeopathic Medicine, University of Michigan, Ann Arbor.—H. M. Beebe.
Dartmouth College School of Medicine.—J. M. Gile.
New York Medical College and Hospital for Women.—C. C. Bram.
Long Island College Hospital.—E. H. Bartley.
College of Homeopathic Medicine, Ohio State University.—F. B. Grosvenor.

ACCREDITED REPRESENTATIVES

The following were accredited representatives from the government medical services, national and state medical societies and state medical examining boards:

UNITED STATES GOVERNMENT

Medical Corps, U. S. Army.—Wm. Stephenson.
U. S. Public Health Service.—J. C. Perry.

NATIONAL SOCIETIES

American Academy of Medicine.—W. S. Hall, L. H. Mettler and C. R. Bardeen.
Council on Medical Education, American Medical Association.—N. P. Colwell, Chicago.
Federation of State Medical Boards.—J. K. Scudder.

STATE MEDICAL EXAMINING BOARDS

Colorado.—David A. Strickler, Denver.
Florida.—E. W. Warren, Palatka.
Illinois.—John A. Robison, Chicago; R. D. Luster and E. Berg, Springfield.
Indiana.—W. T. Gott, Indianapolis.
Iowa.—Walter L. Bierring, Des Moines, and G. F. Severs, Centerville.
Kansas.—L. P. Gaillardet, Formoso; J. E. Sawtelle, Kansas City.
Louisiana.—E. L. Leckert, New Orleans.
Maryland.—Henry M. Fitzhugh, Westminster; J. McP. Scott, Hagerstown.
Massachusetts.—Walter P. Bowers, Boston; Chas. H. Cook, Natick.
Michigan.—Beverly D. Harison, Detroit; Arthur M. Hume, Owosso; Geo. L. Le Fevre, Muskegon.
Mississippi.—I. W. Cooper, Newton.
Missouri.—J. A. B. Adcock, Jefferson City.
New York.—Otto V. Huffman, Albany.

North Carolina.—H. A. Royster, Raleigh.
Ohio.—Geo. H. Matson, Columbus, and L. E. Siemon, Cleveland.
Oklahoma.—John W. Duke, Guthrie.
Oregon.—K. A. J. MacKenzie, Portland.
Pennsylvania.—J. M. Baldy, Philadelphia; C. L. Johnstonbaugh, Bethlehem; Wm. Alvah Stewart, Pittsburgh.
Rhode Island.—Gardner T. Swarts, Providence.
Vermont.—E. B. Whitaker, Barre, and S. W. Hammond, Rutland.
Virginia.—J. N. Barney, Fredericksburg.
West Virginia.—S. L. Jepson, Wheeling.
Washington.—C. V. Suttner, Walla Walla.
Wisconsin.—F. T. Clark, Waupun.

STATE MEDICAL SOCIETIES

Alabama.—L. C. Morris, Birmingham.
Arkansas.—Morgan Smith, Little Rock.
California.—T. C. Edwards, Salinas.
Colorado.—W. A. Jayne, Denver; Hubert Work and R. W. Corwin, Pueblo.
Indiana.—J. N. Hurty, Indianapolis.
Iowa.—L. W. Dean, Iowa City.
Kentucky.—A. T. McCormack, Bowling Green.
Maryland.—H. M. Fitzhugh, Westminster.
Massachusetts.—H. C. Ernst, Boston.
Michigan.—Reuben Peterson, Ann Arbor.
Minnesota.—John T. Rogers, St. Paul.
Mississippi.—W. S. Leathers, University.
Montana.—W. P. Mills, Missoula, and W. L. Reinck, Butte.
New Hampshire.—J. M. Gile, Hanover.
New Mexico.—W. E. Kaser, East Las Vegas.
North Carolina.—John A. Ferrell, Washington, D. C.
Oklahoma.—C. R. Day, Oklahoma City.
Pennsylvania.—Wilmer Krusen, Philadelphia.
Tennessee.—J. A. Witherspoon, Nashville.
Texas.—C. E. Cantrell, Greenville.
Vermont.—A. L. Minor, Bellows Falls.
Wisconsin.—Charles R. Bardeen, Madison.

The following were also present: Carnegie Foundation—Henry S. Pritchett, New York; Council on Medical Education, American Medical Association—Arthur Dean Bevan, Chicago; J. W. Holland, Philadelphia; H. D. Arnold, Boston; George Dock, St. Louis; Council on Health and Public Instruction, American Medical Association—H. B. Favill and Frederick R. Green, Chicago; Council on Medical Education, American Insti-

tute of Homeopathy—George Royal, Des Moines; W. A. Dewey, Ann Arbor; United States Bureau of Education—Kendric C. Babcock, Urbana, Ill. V. C. Vaughan and G. I. Naylor, University of Michigan, Ann Arbor, Mich.; M. G. Seelig and C. H. Neilson, St. Louis University, St. Louis; J. McClintock, Iowa State Universitly, Iowa City; A. D. Dunn, Creighton Medical College, Omaha; Edward Jackson, University of Colorado, Denver; Loren Johnson, Georgetown University, Washington, D. C.; L. S. McMurtry, University of Louisville; W. O. Bridges, University of Nebraska, Omaha; Hans Zinsser, Columbia University, New York; J. Ewing, Cornell University, New York; C. S. Bacon, R. G. Hoskins, D. J. Davis, Wm. H. Browne, T. H. Boughton, J. G. Moore, D. P. Teter, H. Van de Erve, Chas. P. Small, Norval H. Pierce, J. Rawson Pennington, Franklin H. Martin, Allen B. Kanavel, J. P. Simonds, Hugh McGuigan, Charles Spencer Williamson, K. A. Zurawski, Bayard Holmes, D. N. Eisendrath, S. A. Koppnagle, T. E. Costain, Mrs. W. Henry Wilson and Harold B. Wood, Chicago; Angus McLean, W. H. MacCraken, J. D. Matthews and J. H. Hathaway, Detroit College of Medicine and Surgery, Detroit; J. E. Moore, R. O. Beard and Henry C. Aldrich, University of Minnesota, Minneapolis; Claude A. Burritt, C. F. Junkerman, Columbus, Ohio; B. H. Stone, Burlington, Vt.; Wilbur Helm, Evanston, Ill.; E. S. Spindell, Springfield, Ill.; Miss Margaret Weed, Spirit Lake, Ia.; E. J. Kanavel, Sedgwick, Kan.; Arthur Warren Smith, Winchester, Mass,; J. F. Page, Eureka, Ill.

Randolph Winslow, member of the Executive Council, and Fred. C. Zapffe, secretary-treasurer of the Association, were also present.

MINUTES OF 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 1914, page 77, and, on motion, they were adopted as printed.

ADDRESS OF PRESIDENT

The president, Dr. Dyer, then read his address (see page 5).

REPORT OF SECRETARY-TREASURER

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

The membership of the Association numbers fifty-five. Three new applications were received by the secretary, one from Atlanta Medical College, one from Fordham and one from the University of South Carolina. They were referred to the Executive Council for action. There have been no suspensions and no withdrawals.

A considerable number of state boards demand of applicants for reciprocal registration that the college from which they graduated must at the time of such graduation meet the requirements of this Association, irrespective of whether or not they were in membership. To furnish this information it has been necessary to copy old records and have them certified by a notary. For future use the secretary has compiled the data, so that it can easily be learned just what the requirements were each year since the organization of the Association.

It is suggested that the secretary be empowered to have this information printed, so that the executive officer of every college in membership, of every state examining board, may be given a copy to place on file. Verification under notary's seal will be furnished on request.

Five hundred copies of the Transactions of the 1914 meeting were distributed. By a ruling of the Chicago postal authorities, these Transactions had to be sent by parcels post — a few at five cents apiece, some at twelve cents apiece—the majority at from eight to nine cents apiece, depending on the zone in which the receiving office was located. The book was bulkier than any preceding volume, and the postage bill was therefore quite large.

Each college in membership and every state examining board also received a copy of the revised Constitution.

According to instructions from the Association received at the last meeting, a joint program with the Federation of State Medical Boards was arranged for the Federation and the Association, each selecting two subjects for discussion.

Invitations to appoint delegates to the meeting were sent to the government medical services, the state examining boards and the state medical societies. The majority have responded favorably. This plan has been followed for the past four years, and some societies regularly appoint such a delegate at their annual meetings—a practice which all societies should be urged to follow.

As to the financial status of the Association, there is now a cash balance of $515.77 in the treasury.

(Signed) FRED. C. ZAPFFE.

The Chair appointed the following Auditing Committee to examine the accounts of the treasurer: Drs. H. E. Tuley, W. F. R. Phillips and W. S. Carter.

At this juncture the President called for the Report of the Committee on Nominations, who thereupon submitted the following:

For president: John L. Heffron, Syracuse, N. Y., and C. R. Bardeen, Madison, Wis.

For vice-president: R. Dorsey Coale, Baltimore, Md., and Reuben Peterson, Ann Arbor, Mich.

For secretary-treasurer: Fred. C. Zapffe, Chicago, and Guy L. Noyes, Columbia, Mo.

Executive Council: F. C. Waite, Cleveland; W. S. Carter, Galveston, Tex.; S. W. Lambert, New York, N. Y., and W. P. Harlow, Boulder, Colo.

(Signed) IRVING S. CUTTER,
WILLIAM PEPPER,
L. E. BURCH.

The Chair appointed as tellers Drs. Paul G. Woolley and Wm. P. Harlow. The vote having been taken and counted, the tellers announced that the following nominees had received each the majority of votes for election to the office for which they were named:

President: Dr. Charles R. Bardeen.

Vice-President: Dr. Reuben Peterson.

Secretary-Treasurer: Dr. Fred. C. Zapffe.

Members of Executive Council, to serve two years: Drs. F. C. Waite and Samuel W. Lambert.

The Chair then declared those receiving the majority of votes cast duly elected to office.

INSTRUCTION IN TUBERCULOSIS

Dr. Wm. Chas. White, Pittsburgh, was given the courtesy of the floor to present a plea on behalf of the National Association for the Study and Prevention of Tuberculosis with reference to instruction in tuberculosis in medical colleges. After a few brief remarks, Dr. White introduced the following resolution:

RESOLVED, That the Association of American Medical Colleges approves the action of the National Association for the Study and Prevention of Tuberculosis in bringing the subject of tuberculosis and medical teaching to its notice, and requests the National Association to urge its constituent dispensaries and sanatoria to open their facilities for teaching to the teaching faculties of accredited medical schools.

This resolution was referred to the Executive Council for consideration, the Council to report before the close of the session.

REPORT OF EXECUTIVE COUNCIL

The report of the Executive Council was called for and presented by the Chairman of the Council, Dr. Means.

1. Disposition of formal applications for membership made one year ago.

(a) Atlanta Medical College, Atlanta, Ga.

This college was inspected by Drs. Waite and Means, December 1, 1914, and inasmuch as they found the conditions unfavor-

able to membership and so reported to the college authorities, the application was withdrawn.

(b) Medical Department of the University of Tennessee, Memphis, Tenn.

A joint inspection of this college was made by Drs. Means and Waite for the Association and Dr. Colwell for the Council on Medical Education. The report made by the inspectors indicated that the institution is worthy of being classified as an acceptable college and therefore worthy of membership in the Association. The Council recommends that the college be admitted to membership.

(c) Medical Department of the University of West Virginia, Morgantown, W. Va.

The college was inspected on the second day of November, 1914, by Drs. Means and Waite. Their report was that the conditions of the college were not up to an acceptable standard and therefore the Council recommends that the application be not accepted.

2. Report on colleges, members of the Association, placed in Class B by the Council on Medical Education.

(a) Medical Department of the University of Southern California, Los Angeles.

A joint inspection of this college was made on December 7 and 8, 1914, by Dr. Means, representing the Association, and Dr. Colwell representing the Council on Medical Education. While the report of Dr. Colwell to the Council on Education was unfavorable to a higher classification than B, both inspectors felt that the educational conditions were sufficient to justify continuing the college in membership in the Association, and the Executive Council therefore recommends that the college be retained in membership pending certain improvements contemplated and in process of development.

(b) John A. Creighton Medical College, Medical Department, Creighton University, Omaha.

A joint inspection was made December 17, 1914, by Drs. Lyon and Means for this Association, and Dr. Colwell for the Council on Medical Education. The improvements made by the college in its laboratory departments and pedagogic methods were considerable, yet they were not deemed sufficient by Dr. Colwell to justify a higher rating at the present time than B. There was a manifest spirit prevailing throughout the faculty to bring the institution to an acceptable standard, therefore the Executive Council recommends that the college be continued in membership, pending further development.

3. Report on colleges in membership that were charged with not complying with the rules governing the admission of students.

(a) The Medical Department of Vanderbilt University, Nashville, Tenn.

This college was charged by its neighbors with admitting students to the session of 1913-14 on less than the required 14 units of secondary work and of admitting students to the freshman class, session of 1914-15 on less than the prescribed one year of college work in chemistry, physics, biology and a modern language. An inspection was made in January, 1914, by Dr. Means representing the Association of Colleges, and Dr. Colwell representing the Council on Medical Education. On December 4, 1914, Dr. Waite inspected the college. The report of the inspectors shows that the charges of non-conformance with the 14 unit entrance requirement for 1913-14 were not well founded, but the charges of non-compliance with the requirement for admission, session of 1914-15, were sustained. Therefore, the Executive Council recommends that the college authorities should be advised that the Association regrets to learn that a college of such high standing as Vanderbilt should not adhere more strictly to the preliminary educational requirements of the Association, and further, that the University authorities are requested to have all students with entrance conditions remove them before promotion, and to exercise more care in the administration of credentials of applicants presenting themselves for admission in the future.

(b) The Medical Department of the University of Louisville, Louisville, Ky.

A joint inspection of the college was made on December 1, 1914, by Drs. Waite and Means representing the College Association, and Drs. Colwell and Arnold representing the Council on Medical Education. There was no evidence found to sustain any charge that the college had not complied with the rules of the Association in admitting students to the freshman class of 1914-15.

(c) The Medical Department of the University of Alabama, Mobile, Ala.

This college was inspected by Dr. Dyer in December, 1914, and he reported that the college is complying with the entrance requirements laid down by this Association, and stated further that there was a commendable spirit in the faculty and among the officers to maintain a standard that will continue the present classification.

(d) Medical Department of the University of Cincinnati, Cincinnati, Ohio.

The attention of the Executive Council as well as other organizations was directed to the fact that the medical department of the university had matriculated students who had been in attendance in low grade colleges and given advanced standing that did not meet the published educational requirements for admission to

the college and were given credit for attendance contrary to the rules and regulations of the Association. Careful investigation by the Council on Education confirmed the correctness of the charges. Some ten or twelve students were admitted to the second, third and fourth year classes who could not comply with the preliminary requirements in force at the time the members of these classes were matriculated. Dr. Paul G. Woolley, representing the college and speaking for the president of the university and the dean of the medical college, stated to the Executive Council that these admissions were made by the registrar without knowledge of the dean, and in support of his statement, read letters written by President Dabney and Dean Holmes, in which they expressed their regret and disappointment that such irregularities had crept into the administration of the affairs of the college and assured the Council on Education and the Association that they would not occur again. The Executive Council with the concurrence of the delegate of the Council on Education, recommends therefore, that the university authorities be advised to sever connection at the end of this session with all students who did not meet the published requirements of the college and the rules and regulations of the Association, and that these students shall not be readmitted until such time as they may satisfy the Committee on Admission of the College of Liberal Arts that they are acceptable.

The Council further recommends that the university be advised that hereafter the authority to pass on entrance credentials of applicants for admission to the medical school should be placed in the hands of the Council on Admission to the University.

4. New applications for membership.

Formal application for membership has been made by (a) the Medical Department of the University of South Carolina at Charleston, and (b) the Medical Department of Fordham University, New York, N. Y.

An inspection of these colleges will be made during the ensuing year and reports made to the Council for consideration.

(Signed) W. J. MEANS, Chairman.
RANDOLPH WINSLOW.
F. C. WAITE.
E. P. LYON.
ISADORE DYER.
FRED. C. ZAPFFE.

The report was considered item by item, and each item was approved as read. Dr. Heffron moved that the report as a whole be adopted. The motion was duly seconded and carried unanimously.

REPORT OF COMMITTEE ON MEDICAL EDUCATION AND PEDAGOGICS

The report of the Committee on Medical Education and Pedagogics being called for, was presented by the Chairman of the committee, Dr. Harlow.

DR. HARLOW: Before reading the report of the Committee on Medical Education and Pedagogics, I desire to offer a word of explanation. When the replies to the questionnaire began to come in, it was apparent that some change in our entrance requirements might be deemed advisable, therefore I telegraphed Dr. Zapffe within the thirty-day limit prescribed in our constitution offering the following amendment. "After the word *addition* in the last phrase, paragraph *A*, Section 1, Article 3, insert the words, 'two years in an accredited college including' one year each, etc." Later by letter I explained that I hoped that he understood that it was my desire to make possible any changes that the Association may determine, having to do with any part of Article 3, relating to high school or premedical entrance requirements.

In working over the data received in ninety-one replies to our questionnaire, it was impossible to print anything like a full statement of the college's attitude toward the question, and I attempted to pick out the essentials and to state opinions that were at variance with each other, not repeating matters commonly accepted; principal thoughts in some answers were embodied in the summary and not credited to any one institution.

REPORT OF THE COMMITTEE

PRELIMINARY REQUIREMENTS

The present requirements of the Association for entrance upon the study of medicine have now been in actual operation a sufficient time to exhibit to some extent their practical value and the difficulties which attend their observance and enforcement.

Of the institutions to which the questionnaire was sent, all but three made some response to Question 1, offering either criticism or suggestion or both. The substance of these replies, some of which are voluminous, has been printed in the data now placed in the hands of members of this Association.

Questions 2, 3, 4 and 5 are such as could be answered fairly by yes or no. Tables of the responses received regarding them have also been printed and study of these tables shows that twenty believe that the required college work can be given in one year, twenty-two believe it cannot, and four are doubtful. But by the answers given to Question 3, only twelve believe that it can be given in one year without interference with the usual freshman schedule of the College of Arts or Sciences, while twenty-eight are sure it cannot and only one is doubtful.

By the responses to Question 4, forty-one express the belief that such work would or should be recognized among credits for the A.B. or B.S. degree, while only three respond in the negative and one is in doubt. As

to whether such a course compressing three laboratory sciences into one year presents the subjects to medical students in the most useful way there is much more skepticism. Ten believe that it does, twenty-six that it does not and six are doubtful about it.

Considering the general trend of the responses to the first five questions, we find that certain facts stand out clearly. There are three views with regard to the college work required preliminary to the medical course: (1) That it cannot be given thoroughly in one year of any regular college course now offered; (2) that it can be given in one year in a course specially arranged for the purpose; (3) that a course quite similar to it might be given in one year of the ordinary college course in arts by an arrangement to give recognition to closely correlated high-school work done in the required branches.

ONE OR TWO COLLEGE YEARS

If it is the purpose of the Association to require of all entering upon the study of medicine a certain amount of work of college grade in physics, chemics, biology and the modern languages, and at the same time to require the general cultural value of pursuing for a time a course of study such as commonly leads to a degree of Bachelor of Arts, it is clear that the majority of members of this Association believe that this cannot be done in one year. Twenty-two simply answer "No" to Question 2, and four are doubtful. But of the twenty who believe the required work can be done, Alabama suggests that the required work must be given the first consideration; Louisville, that it should be taken with other subjects; Tulane offers a special schedule arranged for these premedical students, and if they change their purpose they are required to make up first-year differences to meet the B.A. or B.S. requirements; Detroit thinks the Arts schedule should be rearranged, and from the Medical Department of the University of Michigan comes the opinion that the one year requirement will never be satisfactory; Minnesota thinks the proper permedical course in physics would be hard to arrange unless enough students would take it to warant a special section for their benefit, and it is doubtful whether a foreign language should be included in the requirements on a one-year basis; North Carolina holds the premedical physics and the languages not quite equivalent to a college course; North Dakota answers in the affirmative, if a special course be provided for it; Texas holds that with English added the course is difficult for any but the best students; and Vermont makes its "yes" apply to "bright students." For some institutions like Western Reserve, Pennsylvania and Pittsburgh, which did not specificially answer this question, an answer is expressed in their entrance requirement of two premedical college years. Clearly it is a very small minority of those institutions engaged in preparing and teaching medical students who believe the required premedical branches may be included in one year of college course leading to the Arts degree.

That the required branches may be given in one year in a course arranged especially for that purpose and excluding everything else finds a larger minority to support it. But that such a special course would be recognized as a complete year toward the A.B. degree is not claimed by the bulk of its supporters; although such a recognition might be accorded it for the degree of B.S. In the long run, and not such a very

long run either, the colleges of liberal arts and sciences are fairly certain to give full recognition for their degrees to any courses in the fundamental sciences in question which the medical schools find adequate for their needs. This will be increasingly true of such courses offered in the universities.

This discussion of the question of a special premedical course is confined to a special arrangement of hours in an institution that is already giving complete college courses in physics, chemistry, biology and the modern languages, without reference to attempts to organize a premedical year in institutions which have not already established effective courses in other branches. Attempts to meet the requirements as to preliminary education by arranging a premedical course as a sort of adjunct to a medical college cannot be approved even approximately by this committee, for such a scheme can result in no saving of time or money for the student. Neither the conditions of study nor the spirit of the teachers will be much different from those of a "cramming school," and not a single medical school in the country can afford to divert its energies to such a purpose. To quote the words of President Pritchett of the Carnegie Foundation: "One of the worst features of the whole process is the premedical school set up in the detached medical colleges apart from colleges and universities. These are unjustified from any point of view and are in effect parasites on our educational system. Their sole purpose is to obtain students."

College courses of this sort should not enter into this discussion, although when the special premedical year is recognized anywhere they must become a troublesome problem to deal with. The demand for such a special premedical course is the most striking practical effect of our one-year requirement. It may give the best preliminary education that can be required at present, but it is not one year of regular college work.

The third possibility lies in some lessening of the requirements regarding physics, chemistry, biology and German or French by giving credit for time spent on one or more of these branches in high school, or by substituting English for French or German. If, as several of our members hold, it is not practicable to require in the college year physics based on a previous study of even plane trigonometry, there seems little reason to draw any sharp line between high-school physics and college physics. If the college chemistry is to include the beginning of any study of inorganic chemistry, it is hard to see why such a beginning might not be made before coming to college. From many of the replies it appears that the premedical year in biology is expected to include little more than is now given in some good high schools, while some of the answers received express the opinion that a part of the college year will be better spent on English than on French or German.

In one of these three directions the Association must move if its requirements of preliminary education are to be made more practical and definite. In recognition of this situation this committee has proposed the amendment for Article III, to require two years of college work. This would give ample time for a study of those branches deemed essential for entrance on the study of medicine. This proposition opens the way for the discussion of the whole subject of entrance requirements and for amendment of said Article in such direction as the Association prefers.

CORRELATION OF PREMEDICAL AND MEDICAL COURSE

The Questions 6 and 7 dealing with this subject brought out fewer responses, thirty-six in all. In these are found but few important suggestions. Among the most definite is the one expressed by Leland Stanford, supported by Colorado, Illinois, Harvard, Washington and Western Reserve, reiterating the demand that the course should be spread over two to four years instead of being crammed into one.

Then comes from Southern California a reiteration of the second idea discussed above—"Have a regular recognized premedical year with specified courses"; and this idea is supported by Alabama, Yale, Iowa, Tulane, Physicians and Surgeons of Baltimore, Tufts, Detroit, Minnesota, St. Louis, Creighton, Buffalo, North Carolina, Ohio, Cincinnati, Texas, Utah and Virginia.

A different view urged by Colorado, Northwestern, Rush, Illinois, Indiana, Kansas, Harvard, Missouri, Washington and Vermont is that science and language should be taught in the premedical course, simply as science and language in the most broad, thorough manner possible. One purpose of premedical college work is to give a broad basis of knowledge on which the medical teacher, and later the medical practitioner, may draw for ideas and methods not generally applied in medical routine.

As bearing on the correlation of the medical work with the course that has preceded it, a most pertinent suggestion comes from Rush, namely, that a medical instructor should study these subjects himself and should have at least as good and up-to-date knowledge of the sciences as the students who enter his classes. Beyond this, perhaps, it is not necessary to go. Yale expresses the conception of premedical work that it provides the student with the tools and methods that he uses in the medical school. The intelligent instructor in medicine, if he knows thoroughly what these tools and methods are, will certainly point out their applications in his department.

Several institutions speak of the systematic planning of courses together. Certainly such a joint discussion between members of the medical and science and arts faculties as was carried on in Colorado in preparation for this report will be found profitable for many reasons.

If we are to go on a definite two-year basis, we believe that it would be well to teach the sciences as sciences, without regard to the medical school. But if we are to accept "cram" science courses in preparation for medicine, then it certainly falls upon the medical school to determine what the "cram" course shall consist of. Of course it is absurd to lay down a text-book, but we do not think it absurd to state what portions of the subject shall be covered in terms of a standard text. This will definitely state the parts of a subject considered essential, and, further, it will in a degree determine how deeply the subdivision must be gone into.

It seems so certain that the amount and kind of work we are requiring as a prerequisite to medicine cannot and ought not to be given in one year, that wisdom lies only in adopting the two-year rule. Even if two years are taken for the work, attention should be called to the fact that, even with all "soft" electives to fill out the rest of the required hours, the course is considerably harder than the average course pursued for the first two years in college.

English is certainly desirable, but that the course in freshman English in the university will materially improve the spelling, diction and construction that we get on examination papers, we think doubtful. It is our belief and experience that it is easier to teach a foreign language correctly than the native tongue, and if one year of a modern language is of so little use, we would look for no astonishing results from a single year in English composition.

The course in English should include the essentials of clear expression, whether oral or written, and should make sure that the student can do such humble things as spell accurately and punctuate meaningly. Furthermore, it should include an intelligent study of a few of the masters of English prose.

With regard to the modern languages, much has been said and little more need be added. However, if the requirement be made two years, or a reading knowledge, which may be said to be equivalent, much time will have been spent in a subject which, to the average man, is of little or no use. If left at one year, then, if the average man needs the language, he can get it fairly readily with the aid of the dictionary, and a little help, which is always available; i. e., he has had the grammar, and can readily recover it. The general requirements are certainly not adapted to the research man, so why worry?

Biology requirements are the most unsatisfactory, and should be laid down definitely. Biology may be, and in some cases is, considerably more than half botany. Now, botany is a perfectly good course, but so long as it is no longer necessary to the study of materia medica as taught to medical students — and certainly it is not necessary as an introduction to pharmacology — it should be dropped, except as an introduction to biology. One value of botany is the ease with which physiological processes may be taught in their simplest form. Plant physiology furnishes an easy approach to animal and human physiology. Botany also acquaints the student with yeasts, bacteria, moulds, etc.

The instruction in zoology should embrace the study of the protozoa, because of their relation to diseases such as malaria, sleeping-sickness, tropical dysentery, etc.; of worms, especially the parasites, as trichinella, filaria, necator, etc.; of insects, especially as disease-carriers, like the mosquito, the fly, tse-tse fly, lice, fleas, ticks, etc.; and vertebrate animals, as introduction to anatomy, physiology, embryology and histology.

The medical course would be considerably strengthened if organic chemistry could be shunted to the premedical years. A good course in chemistry might be, first, two semesters of general inorganic chemistry, three lectures and two laboratory periods per week; second, one semester of qualitative analyses, together with practice in making and using normal and standard solutions, two laboratory periods of two hours each, plus occasional lectures; third, one semester of organic lectures four hours per week and two laboratory periods of two hours each.

The subject of physics was quite fully discussed in the printed data.

THE CURRICULUM FOR THE FIRST TWO YEARS OF MEDICAL WORK

The advantages to some students of taking a part of the medical course in one institution and part in another may be greater than most teachers or deans of medical faculties recognize or admit. Yet it may be doubted if such wide roving as is common among the students of German universi-

ties should be encouraged, or could be indulged in this country with practical advantage. However, there are a considerable number of students who, for health, financial or family reasons, find it imperative to remove from one educational center to another. For these some approach to uniformity of curriculum is a matter of great importance. Something may be said also in favor of a natural order in which the various branches of medical study are best pursued, and a great deal of effort has been expended of late years in bringing about an approach to uniformity in the amount of time devoted to each particular branch.

Though it may not be uniform in many things, there are special reasons why the medical curriculum should advance to about the same point in different institutions at the close of the second year of the medical course.

The two-year medical schools do very excellent work in the fundamental branches, and no unnecessary obstacles should be placed in their way. There is no essential reason why these branches should be studied in the great clinical centers. Often both the health and morals of the student will be conserved if he be not plunged into the environment of a great city until a somewhat later date.

As our medical curriculum becomes better developed, more importance will attach to examinations at the end of the two-year period, as it does now to the second examination of the conjoint board of London or the Physicum of Germany. It is desirable that this mark of progress in the medical course should have some general, definite significance, and at this point, as at the entrance upon the medical course and at its completion, some approach to uniformity of attainment be secured.

Questions 8 and 9 bear upon this matter. The answers show general agreement in that the group of anatomy, including histology and embryology, physiology, with all parts of chemistry, general pathology and bacteriology, materia medica and pharmacology, should be completed in this period, although Southern California continues to teach anatomy throughout four years.

Other subjects suggested as properly to be taught toward the close of the second year are principles of medicine and surgery, normal physical examination, and possibly physical diagnosis, minor surgery, bandaging, surgical or clinical pathology, cadaver surgery, history-taking, physical therapeutics, obstetrics and anesthetics, hygiene, including personal hygiene. Some lectures on public health might also be included, but preventive medicine should be attempted only after the student has a very thorough knowledge of practice and of pathology. Dietetics, which correlates all of the work in physiology, physiological chemistry, pathology, hygiene, and practice, is obviously a fourth-year course.*

Here is a wide range of subjects to choose from, and some of them are now being taught in most of our medical schools. It would seem that from the most important of them, as required subjects, some might be selected on which there might be general agreement to teach them in the second year, while the others might be left for the latter half of the course.

* Of all schools returning answers to No. 9, 11 specify laboratory diagnosis, 23 specify principles of surgery and dressings, 35 specify physical diagnosis. All other subjects mentioned receive less than 10 advocates.

There are a number of questions not dealt with in the committee report that merit the consideration of a special committee; for instance, the matter of allowable conditions; should organic chemistry be made a prerequisite? should certain high-school credits be accepted as of college grade? the advisability of specifying the courses in biology or chemistry or physics, etc.

Recommendations as to what subjects or parts of subjects commonly taught in the latter half of the course in medicine might well be included in the latter part of the second year is also left to further consideration by this Association or a special committee.

(Signed) Wm. P. Harlow, Chairman.
Kendric C. Babcock,
R. Dorsey Coale,
W. C. Carter.

DATA COLLECTED BY THE COMMITTEE ON EDUCATION AND PEDAGOGICS

Your committee, believing that the formal requirements for admission to the medical schools that are members of the Association of American Medical Colleges should have a real and generally understood significance, framed a questionnaire, which was sent to the deans of said medical schools, to the dean of every college of liberal arts in affiliation, and to a few individual educators.

The answers received, which are tabulated and summarized below, show a wide diversity of view and practice on the part of the educators concerned, which fully demonstrates the need for calling forth the various statements and placing them before this meeting, in the hope that a frank discussion here will lead to the elimination of requirements that are useless or impractical, while giving definition to those on which the Association deems it wise to insist.

Eighty-seven replies of some nature were received, some answering but a question or two, while others went into the various subjects at considerable length. That the subject is of interest to many is indicated by the fact that responses were had from either the literary department or the medical department, and in many cases both, of all members of the Association except George Washington University, the University of Georgia, the University of Mississippi, and Wake Forest College.

A statement of a practical interpretation of the requirements was made as follows:

A. Physics should have a basis of plane trigonometry, and include a reasonable amount (at least half) of laboratory work. If half-credit is given for high-school physics, the other half should be the advanced (or second semester's) work.

B. Chemistry should have ten hours (extreme minimum eight), including two lectures or recitations and two laboratory periods per week, covering the principles of inorganic chemistry, with an introduction to qualitative analysis.

C. Biology should have six hours of general biology (or ten hours of general zoology), covering vertebrate and invertebrate animals. General botany may make up not more than one-half this course.

D. French or German should receive ten hours of college elementary (first-year course) or six hours of intermediate (second-year course).

REPLIES TO QUESTIONS

Nine questions were asked, the first six bearing directly upon the above. Any notation credited to a university may represent the idea of any or all of those replying to that question from that institution, unless otherwise noted.

Question No. 1.—Have you any criticism or suggestion in regard to this working out of these courses? Should the requirement in each subject be made more specific, perhaps as stated in pages or sections of a standard text or a detail of laboratory work, etc.?

Alabama: Additional requirements of prospective medical students include English, algebra and trigonometry and psychology; therefore, a two-year course.

Leland Stanford: Work should be fully equivalent to the courses offered in the universities of the United States to non-medical as well as medical students as introductory courses, the taking of which is required in order that advanced work may be carried on.

University of California: (Reply delayed.)

University of Southern California: The number of hours and the text to be covered should be specificially set forth.

University of Colorado: (See summary).

Yale Medical School: Don't specify. Work should be reasonably equivalent to some course selected as standard.

Georgetown University: Coordination of premedical schools is imperative. This would be had if subjects were itemized and laboratory work detailed. Due regard should be had here to after-work in medicine.

George Washington University: (No reply.)

Howard University: No reason for definite statement of work in pages or sections. The teacher should have full latitude as to methods, and should be held responsible for the results.

University of Georgia: (No reply.)

Northwestern University: Leave statement of requirements general rather than specific.

Rush Medical College: Chemistry should include qualitative analysis.

University of Illinois: High-school work should not be accepted for any part. Specify number of college hours only.

Indiana University: If the work is done in standard institutions, details may be left to the department concerned.

State University of Iowa: Should be more explicit statement as to the number of hours in the required work, and also as to the general nature of the courses. Not advisable to narrow the courses, however, by stating the requirements in pages or sections.

University of Kansas: More high-school physics should be allowed. Twenty-hours' language necessary for reading, and whether taken in high school or college is of no consequence.

University of Louisville: Physics should have at least a basis of plane trigonometry, and emphasize mechanics of fluids and gases, light and elementary electricity.

Tulane University: A synopsis of courses should be given, with hours of lecture and the laboratory specified; the laboratory exercises in the sciences might be outlined in syllabi.

College of P. and S., Baltimore: Not discussed.

Johns Hopkins University: Physics: Special attention should be given to theoretical mechanics and to mechanical and electrical experiments. Chemistry: Elementary course in organic chemistry, including at least twenty-five to thirty lectures, and ninety to one hundred hours of laboratory work. Biology: Includes a year's laboratory course of six hours or more a week upon the structure, functions, and life-history of selected types of animal and plant life. Botany or zoology accepted, provided the laboratory work has been adequate.

University of Maryland: Requirements as stated should be more specific in the number of hours to be devoted to laboratory work, and in stating whether semester hours are meant or so many hours per week. Trigonometry should not be required as prerequisite to physics. Considerable latitude in the choice of subjects taken up should be left to the instructor.

Harvard Medical School: Don't make uniform demands. Classify colleges, and admit standard students without question; but make definite inquiries if students come from colleges which are of lower standard.

Tufts College Medical School: The required work in each subject should be made more specific. Physics: When half-credit is given for high-school work, it is not logical to require that the other half should be the advanced work. Course should not include higher mathematics, such as trigonometry. Emphasis should be placed upon optics, electricity, heat and cold, rather than upon physics of mechanical engineering.

Detroit College of Medicine: Prescribed courses satisfactory if given by a reputable college.

University of Michigan: Making no requirement in English or rhetoric is a great defect. Physics: One year college physics, without regard to the amount of high-school physics the student may have taken. Chemistry: Two semesters general chemistry; one semester qualitative analysis; one semester organic chemistry. Biology: One full year, consisting of two hours of general zoology and two hours of general botany throughout the year. French or German: Two years' college or two years in the high school and one in college.—Arts Department.

University of Minnesota: (1) Require a reading knowledge of German or French, instead of so many hours. Test by sight reading of biological or anatomical literature. (2) The exact amount of each subject is not so important as the way the work is done and the attempt to adapt it to medical-school needs.—Arts Department.

Essential that allowable conditions be gone into again. For instance, it is known that some schools on a one-year basis have adhered strictly to the rules and refused students that have afterward been admitted, through lax interpretation of the rules, to schools on a two-year basis. Conditions which could be made up by one summer's work, and in subjects which would not seriously cripple the student in carrying his freshman work, should be allowed. Physics: Special course in physics might be arranged, in which the instructor gives the elements of trigonometry required in course of the development of his subject. Laboratory work to be adjusted accordingly. Chemistry: Only in exceptional circum-

stances, when the student has had a particularly good high-school course in chemistry, should a condition be allowed on the one-year plan. Biology: A college course of a minimum of six clock hours throughout the year in general biology or zoology is the best we could secure in the one-year course. The whole premedical year ought to be defined in a different way.—Medical Department.

University of Mississippi: (No reply.)

Saint Louis University: Special time schedule had to be arranged for the premedical school. Special professors are assigned for German, biology and chemistry.

University of Missouri: Too much science crowded into one year. English, history and other subjects should be added.

Washington University: Requirements in physics should be more definitely stated.—Arts Department. The requirements in each subject should be as specific as they are in university catalogues.—Medical Department.

Creighton: The course as prescribed is none too flexible. Chemistry: A few experiments of a quantitative nature should be added. Biology: Six hours of general zoology, rather than six hours of general biology. Difficult to see both botany and zoology in a thorough way in less than two years.

University of Nebraska: Make more specific by indicating the laboratory work required. There should be a course in English for one year at least.

Columbia University: Why cannot work given in a high school, with the proper equipment, be of equal value with the usual college course, and be accepted as of college grade?

Cornell University: The course outlined corresponds very closely to the first year of medicine as given in England and Germany.

Syracuse University: The outline of the four specified subjects is wholly inadequate. Not possible to attain what medical schools must demand in one year of work. The whole subject of secondary and college education needs revision.

University of Bellevue: With a two-year course it would be possible to incorporate more cultural with the science teaching.

University of Buffalo: Specific requirements should be left to individual initiative. English should be added.—Arts Department. Have able teachers, not hampered by too many regulations. Let the courses develop naturally.—Medical Department.

University of North Carolina: Advantage to make requirements more specific. Not necessary to mention text.—Arts Department. Physics: Special course arranged. Not counted for graduation, therefore not quite equivalent to college course. In almost every instance where a special course for premedical students has been provided, it is less than a regular college course, and the effect has been of disadvantage to the student.

Wake Forest College: (No reply.)

University of North Dakota: Physics: While trigonometry is desirable, it would add unnecessarily to the difficulties of enforcing the rule.

Ohio State University: Professor of physics should supply plane trigonometry as part of his course.

University of Cincinnati: Question not discussed. Two years' premedical work demanded.

Western Reserve University: (See summary.)

University of Oklahoma: No college in the country would advise a student to take in one year physics, chemistry and biology, with the amount of laboratory work required, and French or German in addition.

Hahnemann Medical College: Successfully giving instructions in physics, chemistry, biology and a foreign language, all of college grade. Opposed to any further advancement of the educational requirement of medical students.

University of Pennsylvania: Satisfactory work cannot be given for the preparation of medicine in a so-called premedical college year.

University of Pittsburgh: Requires two years of college work, and specifies that this work must be equivalent to that required of students entering the university in the six-year combined degree course.

Vanderbilt University: The premedical college year should in no way be confused with the first-year college work looking toward a B.A. or B.S. degree. This course is intended to present the subjects to the future medical students in the most effective way possible in one year.

University of Texas: English should be required, and German should be advised in place of French. The great variation in science courses in different colleges would make it impossible to enforce a definite standard as to the content of a course or a required text in physics. The most that can be done is to require a certain amount of laboratory work in each of the science subjects. It is perhaps more important to fix a specific requirement as to the ground to be covered in the course in biology than in the other sciences.

Meharry Medical College: Difficult to require plane trigonometry. Allow more freedom in biology.

University of Utah: Rather heavy on the sciences for one year of work. The courses should be more definitely outlined, stating subjects and laboratory hours.

University of Vermont: Each college should be left to decide how best the requirements can be met. Further detail in working out this plan would be a questionable compliment to the honesty of purpose of educational institutions in meeting these conditions.

Medical College of Virginia: Trigonometry desirable, but should not be made compulsory. High-school work should not be repeated in college, and advanced physics not essential.

University of Wisconsin: Opposed to hampering teachers by making too specific requirement.

Questions Nos. 2 to 5 are as follows:

Question No. 2.—Is it practicable to give this required work in one year?

Question No. 3.—Can it all be given in one year without interference with the usual freshman arts schedule?

Question No. 4.—Would such work so given receive full recognition toward a B.A. or B.S. degree?

Question No. 5.—Would such a one-year course present the work to the medical students in the most useful way?

Questions Nos. 6 and 7 were as follows:

Question 6.—What can be done by the arts people to make this work really preparatory to the study of medicine?

Question 7.—What can be done by the teacher in the medical school to coordinate his course with the premedical work?

These questions will be considered together, and attention called by number to either when necessary.

Alabama: Instruction should bear direct reference to its purpose of preparation. Ground the student in the facts and principles. Medical courses should be made to articulate with those previously given.

Leland Stanford: Insist that the prerequisite course shall be distributed over two or four years instead of being crammed into one. See that freshman medical students have had proper preparation, and then enlarge upon it.

Southern California: Have a regular recognized premedical year, with specified courses arranged.

Colorado: (See summary.)

Yale: It is necessary that the arts departments should bravely overcome their feeling that the sciences are not cultural. I do not believe that it is wise to take the accepted arts course and attempt to graft onto it the subjects that are necessary in the premedical course. Why not persuade the arts people to frankly recognize the fact that medicine is an extremely technical subject, requiring special preparation for its understanding, and devise a course having for its purpose preparation for the study of medicine. It is not necessary for the teacher in the medical school to coordinate his work with the premedical courses. My conception of premedical work is that it provides the student with the tools and the methods that he uses in the medical sciences. Of course, medical science often modifies the tools and adapts the methods.

Georgetown: Science departments should engage professors familiar with medical work. Insist on reading, rather than speaking, knowledge of foreign languages.

Howard: Let friendly cooperation between the two faculties show what the medical student needs. Arrange medical courses so as to make them continuations.

Northwestern: Science departments should make their work fundamental and illuminating. See that elementary courses are general and not technical. Medical school should give the technical training, and review elementary work from the professional angle.

Rush: Teach the prerequisite subjects in the most thorough and broadly scientific way possible, with little thought of its medical application. The medical instructor should study these subjects himself, and refresh his knowledge of them by occasional review under a competent instructor. He should have at least as good and up-to-date knowledge of the sciences as the students who enter his classes.

Illinois: Demand a high standard; appropriate prerequisites; give entire influence toward adoption of the college requirements. Present the subject in the most thorough manner from the standpoint of pure science.

Indiana: Simply do the work in the most thorough way. Base the medical work upon what is given in the premedical course, and avoid repetition.

TABULATION OF ANSWERS TO QUESTIONS 2 TO 5, INCLUSIVE

Institution	No. 2	No. 3	No. 4	No. 5	Remarks
Alabama	Yes	No	Yes	Yes	(2) Provided giving such work is made the first consideration.
Leland Stanford	No	No	Yes	No	Two years necessary for real foundation.
Southern California	Doubt	Yes	Yes	Doubt	(2) Heavy work. (3) If special. (5) Depends on student and premedical course given.
Colorado	No	No	Yes	No	Should take two years.
Yale	No	No	Yes	No	(4) Conception of some academic faculties that the sciences have no cultural value is totally false.
Georgetown	Doubt	....	Yes	....	(4) B.S., not B.A.
Howard	No	No	Yes	No	(5) May pass examination, but of no use to him in medical college.
Northwestern	No	No	Yes	No	(3) No English. Too much laboratory.
Rush	No	No	Yes	No	
Illinois	No	No	Yes	No	
Indiana	No	No	Yes	Doubt	(3) If given in good institution.
Iowa	No	No	Yes	No	
Kansas	No	No	No	No	(4) Not in any college with which I am acquainted.
Louisville	Yes	Yes	Yes	No	(5) Should be taken with other subjects.
Tulane	Yes	Yes	Yes	Yes	(3) Special schedule arranged for these students. (4) Students who change their plan of work after the premedical year are required in their second year to satisfy the first-year differences, in order to bring up the equivalent to the B.A. or B.S. requirement. (5) Given one year only subjects which are outlined above offer the only useful premedical course.
P. and S. Baltimore	Yes	No	Doubt	No	

Johns Hopkins	No	No	Yes	Doubt	(2) and (3) Even if all the other studies prescribed for candidates for the B.A. degree were omitted, and the student's whole time concentrated upon the studies above named, they could not all be completed within a single year. We allow only two laboratory courses to be taken in one year.
Maryland	Yes	Yes	Yes	Yes	(2) Chief difficulty is inadequate high schools.
Harvard	No	No	Yes	No	(3) Cannot conceive of a student carrying many more courses than those laid down. Therefore, interference with the study of English. (5) The students would undoubtedly be able to save time if they could have selections from these required subjects, in so far as they pertain to medicine and the medical sciences, and there would be increased usefulness of the courses through increased pertinence of the training.
Tufts	No	No	Yes	No	
Detroit	Yes	Yes	Yes	Yes	(3) Inflexible arts schedule should be arranged to meet views of modern education.
Michigan	No	....	Yes	....	(Arts Dept.) Too heavy for a single year of college work, involves the study of three laboratory sciences at the same time, which would be unfair to any student, especially in his first year.
	Yes	No	Yes	No	(Med. Dept.) It follows naturally the one-year requirement will never be satisfactory.
Minnesota	No	No	Yes	No	(Arts Dept.)
	Yes	Doubt	Yes	Doubt	(Med. Dept.) (2) It is practicable to give fair courses in the three sciences and a fair course in modern language in one year. (5) Doubtful whether a foreign language should be included in the requirements on the one-year basis. Favors college English at least as a substitute.

TABULATIONS OF ANSWERS TO QUESTIONS 2 TO 5, INCLUSIVE—(*Continued*)

Institution	No. 2	No. 3	No. 4	No. 5	Remarks
Saint Louis	Yes	No	Yes	Yes	(4) B.S., not B.A.
Missouri	No	No	Yes	No	
Washington	Doubt	No	No	No	(4) Probably not for B.A. The B.S. is being destroyed by the two-year schools. (5) Perhaps useful as purely technical training, but only with expert teachers. No suggestion of general education can be entertained.
Creighton	Yes	....	Yes	Yes	(4) B.S., not B.A.
Nebraska	Doubt	Yes	Yes	....	(5) This is a matter for the medical staff to determine.
Columbia	No	No	Yes	No	
Cornell	Yes	Yes	Yes	No	The required arts work of the first two years in English and mathematics could not be be given.
Bellevue	Yes	Yes	Yes	Doubt	
Buffalo	Yes	Yes	Yes	Yes	
North Carolina	Yes	No	Yes	Yes	(4) Yes, except that we don't count our premedical physics nor the first year in any language for a degree. Therefore, not quite equivalent to a college course.
North Dakota	Yes	No	Yes	No	(2) If a special course and curriculum provided for it. (5) Provided only one year of college is to be required, let it include eight or ten hours of chemistry, six or eight hours of English, and fourteen to eighteen hours of elective work. With a two-year requirement, it is possible to add physics and the modern languages.

Ohio State ..... No	No	Yes	No	(3) Special sections.
Cincinnati ..... Yes	Yes	No	No	(4) Unless two-year premedical work, then B.S. degree.
Western Reserve ..... No	....	....	....	(2) It might be done in four quarters. Some of the so-called one year of college work given by medical schools is a travesty on education. The one-year requirement is a mongrel, but not wise to advance further at present.
Oklahoma ..... No	No	Yes	....	
Hahnemann ..... Yes	....	Yes	Yes	
Pennsylvania	....	....	....	Two years required.
Pittsburgh	....	....	....	Two years required. College work completed before starting medicine.
Vanderbilt	....	....	....	Satisfactory one-year special schedule provided by Medical Board.
Meharry ..... Yes	Yes	Yes	Yes	
Texas ..... Yes	Yes	Yes	Doubt	(2) With English added, the course is difficult for any but the best students. By giving one and one-third courses in each of the three sciences, and one full course in German or French, it is possible to give the required work in one year.
Utah ..... No	No	Yes	No	(4) Should design special courses.
Vermont ..... Yes	No	Yes	No	(2) To bright students.
Virginia ..... No	No	Yes	No	
Wisconsin ..... No	No	....	No	

Iowa: Arrange specific courses, particularly in physics and biology, including such subjects as are important in medicine.

Kansas: Good, clear-teaching is all that is necessary. Science should lead to the habit of correct observation and accurate reasoning. Language should be taught as a vehicle of communication. Neither should be taught for examinations.

Louisville: Insist on trigonometry and at least two years' high-school German or French before taking up the subjects in premedical courses.

Tulane: Have courses especially provided for premedical students.

P. and S., Baltimore: Employment of competent teachers and establishment of a special premedical course.

Harvard: It is too much to ask the arts people to vary their instruction to all students merely because a small number among the students are to enter medicine. The only plan that seems feasible, under the circumstances, is that of allowing the student to get the more extensive training in the premedical sciences which the arts courses give. The teacher in the medical school, especially if he has been trained in the premedical sciences, naturally relates his work to these sciences as a basis.

Tufts: The science courses should be so modified that they are adapted to the needs of the student of medicine. The medical instructor should take the science courses himself, and plan his work accordingly. Considerable value should be placed on English composition. Judging from the written exercises in the medical course, one is impressed with the ignorance of college men in the art of expressing their thoughts in good English. Students should be taught to write histories in good English, beginning the second or third year.

Detroit: Systematic planning of the courses to prepare the student for thoroughness and independent thinking. These courses should be standardized and made uniform amongst all colleges.

Minnesota: Where the medical students are numerous enough, put them into special sections and plan the work with especial reference to their needs. For example, in physics less methematics, more laboratory work, and experiments specially selected. In biology offer a course in comparative anatomy, specially planned for the medical student; in German, a special course in scientific German, reading anatomical or other medical texts by recognized authors. Where the medical school is in a university, there should be close conference between the teachers in allied subjects. The medical teacher can ascertain the preparation of his students by quizzing at the opening of his course, and adapt his work to his students. Division lines between arts and medical work should be drawn as distinctly as possible, in order that each teacher may know what he should do. Desirable division lines could be worked out at conferences held in connection with meetings of national societies in the various subjects.—Science and Arts Department.

It would be a mistake for every arts college to try to arrange this one year's preparation in medicine. On the other hand, it is the minimum limit we could set. A good way would be for a limited number of colleges to offer the one year definitely arranged from the point of view of preparation for medical study; therefore, a five-year medical course. The teacher in the medical school cannot coordinate his courses exactly to the premedic science work, because such work is bound to have been taken

by the class in a variety of institutions, and under a variety of instructors.—Medical Department.

Saint Louis: Establishment of premedical courses, and have cooperation of the two departmetns.

Missouri: Nothing can be done. Give the students good stiff courses in regular classes. Our theory is that premedical students should be considered as arts students, and medical students as medical students.

Washington: Give two years' college, so as to provide room for more language, English and electives. Make work as sound and thorough as possible.

Creighton: Arts people must take to themselves a science faculty, who may devote themselves exclusively to the work preparatory to the medical course.

Buffalo: Correlate the college work with that which a student will meet in the medical course. Have languages largely of medical nature.—Arts Department. Lay stress on zoology rather than botany. I should not advise teaching these subjects very differently from what would be done in any college course. Apparently a good deal that has formerly been taught in the medical course may now be admitted. The effect is to relieve the first part of the medical course of some of the elementary work, leaving more time for strictly medical work.—Medical Department.

Cornell: It does not seem to me that anything can be done by a teacher in the medical school to coordinate his course with the premedical work. In the first place, the premedical work as given in different high schools and colleges is radically different, and the only way in which the medical teacher can coordinate his work is to establish a certain standard of excellence which must be obtained by all students. It will make no difference what sort of a premedical course is outlined: high standards of work will not be obtained by the medical students unless quality of work is demanded in the premedical course. The great difficulty with all of this premedical work, especially when it covers only one or two years, is that the standard in many of the smaller colleges, and in some of the larger ones, is so low in certain subjects, notably biology, that students who have on paper equivalent requirements have in reality very varied training. The next good work for the Carnegie Foundation would be an investigation of the premedical courses and a showing up of the weak and useless schools.

North Carolina: Premedical students can have special courses in technical German and French. I know of no other aid the science faculty can render to premedical students.—Science Department. The Modern Language Department was asked to provide a course in German, with a view of preparing the students to undertake German references. The request was denied, on the ground that such a course would introduce improper methods.—Medical Department.

North Dakota: The idea of premedical college work is surely half cultural, and not wholly vocational.

Ohio State: Organize the premedical students in separate groups, and consult the medical faculty. Add English, composition, literature, history, economics, ethics, logic and psychology.

Cincinnati: The arts people should outline courses, regular and summer, in order to fulfil the regular premedical requirements demanded

in the shortest reasonable space of time. The medical faculty should keep in close touch with the professors in the arts department.

Western Reserve: The best thing that can be done by the arts people is to cease trying to give the medical-school work in their courses.

Hahnemann: Present science subjects from the medical viewpoint.

Texas: Place the science courses in charge of instructors who know something about the needs of the medical student. Condense these courses so that the science may be taken in one year. Very little can be done by the medical instructors if the students come from a number of institutions.

Utah: In the arts department organize groups or sections, with the medical student's welfare continually in view. Design courses which will be adapted more particularly to medicine. Must be a definite and close understanding between teachers of biology and chemistry and the teachers of anatomy and physiology, anatomy coordinated with vertebrate zoology, physiology with physics, bacteriology with general biology.

Vermont: The best education for a medical man would be somewhat less technical. A broad general training, with strong emphasis upon science and covering at least two years, I should think better than that now required. I think that the premedical course should be such as the medical course demands, not as put above.—Arts Department. The premedical course should be arranged with special reference to the study of medicine, and not taught as a simon-pure science. The coordination should be, make premedical work lead up to medicine.—Medical Department.

Virginia: Courses in the laboratory subjects, when given by a nonmedical teacher, should be carefully arranged after conference with a competent medical teacher, accentuating and bringing out in the courses every practical bearing the subject may have on medicine or surgery. The course should be supervised, if possible, by a medical teacher. The student should be made to realize that this work is part and parcel of his medical training, as much so as anatomy or surgery, and that he has begun the study of his chosen profession when he enters upon this course in the College of Arts.

Questions Nos. 8 and 9 are as follows:

Question No. 8.—What are the essential courses that must be completed by the end of the second year in medicine, and what is the most effective chronological order?

Question No. 9.—What parts of advanced subjects may be taught in the second year of medicine?

It is assumed that a majority of the medical schools are, in the first and second year of medicine, teaching the fundamental medical sciences, and introductions to physical diagnosis, laboratory diagnosis and the principles of surgery and dressings; therefore, completing by the end of the second year in medicine all of anatomy, histology, embryology, physiology, bacteriology, organic chemistry, physiological chemistry, materia medica, laboratory pathology and, perhaps, certain definite parts of laboratory diagnosis, normal physical diagnosis, principles of surgery and dressings, pharmacology and hygiene and preventive medicine.

Some deviations from this schedule are here noted. Some apparent differences are probably due to a variation in terminology, and the courses are really included in the foregoing.

Alabama: Includes chemical physics, pathological physical diagnosis, medical and surgical technic.

Leland Stanford: Introduction to medicine and surgery, pathological histology.

Southern California: Dietetics; anatomy runs from the first to the fourth year, inclusive.

Yale: All chemistry except physiological chemistry finished before medical course. With regard to the most effective chronological order, I think it is possible to make a fetish of this. At the same time, I think it must be recognized that it is wise for the student to have a good knowledge of anatomy before he takes up physical and nervous physiology. He should understand physiological chemistry and histology before he takes up the physiology of nutrition and secretion. He should have been trained in anatomy and histology and embryology before he takes up pathology, and he should have had his training in physiological methods before he takes up pharmacology.

Howard: Includes medical zoology, dietetics, surgical pathology and electrotherapy.

Northwestern: Omits clinical diagnosis and surgery.

Rush: Organic chemistry should be an admission requirement. Adds physical examinations (not diagnosis) and laboratory diagnosis on normal material.

Iowa: Preventive medicine should come later.

Kansas: Adds obstetrics and anesthetics.

Harvard: Adds clinical pathology, surgical pathology and surgical technic. Finds the following order of studies very serviceable: (1) Anatomy and histology; (2) physiology and biological chemistry; (3) pathology and bacteriology; (4) pharmacology and methods of clinical examination, e. g., auscultation, percussion, examination of blood and gastric contents, applied anatomy, etc. Hygiene also may be introduced at this time, though it has, perhaps, a better place toward the end of the medical course.

Tufts: Adds history-taking and neuropathology.

Detroit: Adds public health and physical therapeutics.

Minnesota: First two years of medicine should not be invaded by the clinical branches to a greater extent than a course in normal physical diagnosis, to be offered in the last part of the second year, with perhaps general directions as to history-taking, etc.

Missouri: Gives no clinical diagnosis.

Columbia: Adds clinical pathology, obstetrics and elementary medical clinics.

Cornell: Gives elementary courses, including obstetrics, covering only fundamental principles in preparation for the third and fourth years' work.

Bellevue: Gives cadaver surgery and omits laboratory diagnosis.

Buffalo: Formerly gave obstetrics during the second year but abandoned the course because of its doubtful value.

Western Reserve: Two or three hours a week in the last half of the second year should be given to introductory non-clinical courses in medicine and surgery. This will be an incentive to the student to do some reading in the summer between his second and third year, and also to do a certain amount of dispensary work.

Meharry: Omits physical and laboratory diagnosis and surgery.

Texas: Omits laboratory diagnosis.

Vermont: Adds therapeutics.

Virginia: Suggests obstetrics as a possibility.

Wisconsin: Anatomy, including gross anatomy, microscopic anatomy, neurology, embryology and some regional anatomy, physiology, physiological chemistry (preceded by organic chemistry in case this is not completed before the medical school is entered), bacteriology, pathology, pharmacology and toxicology, and the elements of physical diagnosis, clinical laboratory work, minor surgery and bandaging. Anatomy, gross and microscopic, and physiological chemistry should, in the main, precede physiology and bacteriology, while pathology and clinical diagnosis and pharmacology and toxicology can be taken with best advantage after the courses mentioned have been completed.

ENGLISH

Although this is not one of the premedical requirements of the Association, it has been mentioned in so many of the replies that it is entitled to special notice.

Ohio State: Premedical students, like others, need English language, composition, literature, American history, economics, ethics, logic and psychology. Therefore, two years required.

Texas: By all means, a fifth course, English, should be required, and German be advised in place of French.

Utah: Freshmen certainly need a stiff course in English.

Vermont: Good training in English very important.

Virginia: Two years should be allowed in which to cover the prescribed work, adding English, history and logic.

Northwestern: There is no room in this one-year course for English.

Michigan Arts: One year college rhetoric, three hours per semester.

Cornell and Buffalo: Require freshman English.

FRENCH

Colorado: In the University of Colorado the requirement of one year of college French for admission to the School of Medicine is met by the first-year course, ten hours, or the second-year course, six hours. Students from standard institutions presenting not less than ten hours' credit for one year of college French may be admitted upon recommendation of the head of the Department of Romance Languages. Work equivalent to Fraser and Squairs Elementary French Grammar, plus about two hundred pages of graduated French prose, should be taken.

Harvard: One year in languages not enough. Student may be able to do something with French at sight after a year's training. Possibly he could labor, with a dictionary, at German.

Michigan: Two years' French or German, or two years in the high school and one in college.

Require reading knowledge of German or French, instead of so many hours. Test by sight-reading of biological or anatomical literature, thereby adapting it to medical-school needs.

Buffalo: Have reading in French or German of a scientific, partly, perhaps, of a strictly medical nature (though not omitting a due amount

of cultural reading), so as to familiarize them with scientific phrases and idioms, and to encourage them in keeping up their study and reading foreign languages.

North Carolina: Two years' work in either French or German is considered necessary for mastery of the language for reading purposes, but three or four hours per year is the usual amount allowed.

GERMAN

Colorado: The requirement of one year of German is met by the elementary course, ten hours, or the intermediate course, six hours. When three years of high-school German are presented for admission to the university, the above requirements may be considered met, upon recommendation of the head of the Department of Germanic Languages. The course in scientific German covers the requirement when two years of high-school German have been presented for admission. It is understood that the official record should contain a note to the effect that the course is a six-hour course, although, in the College of Liberal Arts, only four hours' credit is given. From standard institutions, upon recommendation of the head of the Department of Germanic Languages, a college course of less than ten hours may cover the one-year college requirement. The student should be taken completely through a German grammar, as, for instance Vos' Essentials, and read at least two hundred pages of good prose, not more than twenty-five or thirty of which should be Maerchen (tales, fables, legends). A thorough knowledge of German construction, and the reading of any first-class prose drama, prepares the student in the best way for a reading knowledge in any of the sciences.

Iowa: The value of German or French, outside of its general educational value, is limited almost entirely to the occasional research man who may be developed.

Kansas: The language requirements are poorly arranged, as a "reading knowledge" is the aim. At least twenty hours is necessary for that, and whether it is of high school or college is of no consequence.

Louisville: Two years' high-school training in German or French should be required. One year's work in elementary language is of little value.

Johns Hopkins: Suggests a two-year course in French and German, one required for matriculation, the second additional thereto.

BIOLOGY

Colorado: The requirement of one year of biology is met by general biology, six hours, or general zoology, ten hours. Courses presented from other institutions must include zoology, covering vertebrate and invertebrate animals. There is no objection to a reasonable part of the course being in botany, providing the preceding is fulfilled.

Alabama: Get first the anatomy of one animal thoroughly, before attempting that of many. It would be more profitable to learn the human body than to put half the time on worms, etc.

University of Illinois: Does not see why six hours of general biology should be balanced by ten hours of general zoology. The proportion should be directly opposite. Not desirable to mix specifications concerning text or the precise content of laboratory work.

University of Illinois: High-school work should not be accepted for any part of the college requirement.

Iowa: Recognized courses in zoology meeting the requirement, but not botany. Not wise to state requirements in pages or sections of text.

Tulane: Embryology should be given the first year of the course in medicine. A course in zoology has very little practical value in the pre-medical work, and for such a short period of instruction, it remains largely cultural. With the botany it is different, as the student is made to think of botanical terms at least, and if the course is made to apply in some degree to medicinal plants, the student begins his study of materia medica with some comprehension of the terms employed. It will be desirable to require a full session's work in botany.

Johns Hopkins: Three lectures a week, in addition to the class (three hours per week), a year's laboratory course of six hours or more a week upon the structure, functions, and life-histories of selected types of animal and plant life. It is desirable that the course should include laboratory instruction in embryology.

Michigan (Arts): One full year biology, consisting of two hours general zoology and two hours general botany, throughout the year.

Minnesota (Arts): Offer a course in comparative anatomy especially planned for the medical student.

Minnesota: Why differentiate between six hours given in biology and ten hours given in zoology? A college course of a minimum of six clock hours throughout the year in general biology or zoology is the best we could secure in a one-year course.

Creighton: Suggests six hours zoology, rather than general biology. Would take two years to give anything like thorough courses in both subjects.

Should include comparative anatomy. General botany should be limited to a maximum of one-half the course.

Western Reserve: Eight hours of biology, of botany or zoology, or any combination of these, should be accepted. It is quite true that vertebrate zoology seems better than botany, but we must provide for conditions where zoology is not given. It is best to make a requirement that can be absolutely lived up to, and not give an opportunity for substitution and evasion. Both in chemistry and biology, half the credit should be for laboratory work. No laboratory exercise of less than two hours' extent can be recognized.

CHEMISTRY

Colorado: The requirement of one year of chemistry is met by the ten-hour course in general inorganic chemistry. For students from other institutions there should be demanded a course with a minimum of eight hours per week for one year, including two lectures or recitations and two laboratory periods a week, covering, didactically and experimentally, the principles of inorganic chemistry. It is thought that a one-year course in inorganic chemistry may not satisfactorily include quantitative analysis or more than the merest introduction to qualitative analysis.

Stanford: Work in these subjects should be fully equivalent to the courses offered in the universities of the United States to non-medical

as well as medical students as introductory courses, the taking of which is required in order that the advanced work may be carried on.

Southern California: A specified course in chemistry of not only so many hours, but subject-matter to be covered.

Northwestern: In the latter course in chemistry, the instructor should review elementary work from the professional angle.

University of Chicago: Work in chemistry to include qualitative analysis.

Iowa: Ten-hour requirement to include general chemistry and qualitative analysis; about one-half the work to be laboratory.

Johns Hopkins: Suggests that the prerequisite chemical course include an elementary course in organic chemistry of at least twenty-five to thirty lectures. (Ekley thinks organic cannot be properly presented in thirty lectures.)

Harvard: The chemistry requirement had better include also organic chemistry. Better to have the student introduced to organic chemistry, rather than get a smattering of qualitative analysis.

Michigan: Either one or two semesters' work in general chemistry (high-school chemistry is sometimes credited) and followed by one semester in qualitative analysis and one in organic chemistry.

Minnesota: Only in exceptional circumstances should a condition be allowed in chemistry.

Creighton: Suggests that a few experiments of a qualitative nature be added.

North Carolina: Give a course covering a year and two laboratory periods a week, one-half in simple organic chemistry, the other half in biological chemistry, to the first-year medical students, and give the ordinary physiological chemistry to second-year students.

Western Reserve: The ten-hour requirement is based on five-hour courses. In some institutions the courses are three hours. In such case, three half-years will give nine hours; therefore, requirement should be eight hours, rather than ten. I am not in sympathy with same, as some of this should be qualitative analysis.

ON THE QUESTION OF PHYSICS AS A PREMEDICAL STUDY

In regard to the subject of physics, an examination of the replies to the questionnaire reveals some interesting situations, to say the least. It is somewhat difficult to draw general conclusions owing to the fact that the meaning of the question has been interpreted quite differently in the various replies. Some have had in mind the effect of certain requirements in their own schools, others the effect from the standpoint of practicability in general; still others what is best for the future doctor of medicine; many have contented themselves with general remarks without touching particular points. However there is enough of agreement and disagreement to make it evident that the Association should take a definite position in certain things.

That the subject of physics should be required as a prerequisite for the study of medicine I think may be regarded as settled. The larger proportion of the strongest schools are demanding a full year of college physics in addition to what may be presented from the high school. A majority of the remainder regard the amount proposed in the question-

naire as the minimum requirement, to be advanced to the full year requirement as soon as possible. There still remains, however, this very fundamental question: What should be the nature of the physics course for premedical students? That is, should the premedical student get his physics in a thorough, broadly scientific way as a branch of pure science whose principles and methods are needed by him as a part of his general scientific training, or should he study only those facts, laws, instruments and their applications which are likely to be immediately useful to him in his business. In short, in his training in physics (and this applies to the other sciences also) to be broadly scientific or vocational?

A goodly number of the replies to the questionnaire did not mention this point specifically. But of those who did sixteen favor a general scientific training, the best that the departments of arts and science can give, with little or no thought of its application to medicine. These claim that such a course furnishes the best training for the medical profession. With these sixteen are probably to be counted ten or twelve more. Eight or nine want special courses, dealing mainly with those things of specific or immediate usefulness. Three argue for a mixed course, the regular course with emphasis on those parts which are likely to be of use to physicians.

In regard to the requirement of trigonometry as a prerequisite for college physics, eleven institutions say yes, with whom probably are to be counted ten more, judging from the character of the work in physics which they give. Six say no, while four say the requirement is doubtful or impracticable.

A variety of opinions is expressed in regard to a more definite statement of the physics requirement Six institutions think no form of prescription should be attempted. Three favor prescription in general terms only, something like that indicated in the questionnaire. Eleven want the requirement stated in specific terms; of these four want complete specification of the entire course and seven want parts only specified in detail.

DISCUSSION OF THE FOREGOING

The following discussion deals with the foregoing under the following heads:

1. Should training in physics be broadly scientific or vocational?
2. Should trigonometry be required as a prerequisite for college physics?
3. Should the requirement in physics be specified in whole or in part?

1. Is the future physician to be a man broadly trained in science, or is he to know medicine only, and such smatterings of physics, chemistry, and biology as may be deemed of immediate use to him? The Association should take a stand in this general question as it is one of fundamental educational policy. In my opinion the majority of our institutions, as indicated above, in standing for thorough scientific training in these fundamental subjects, without regard to their immediate applications to medicine, is absolutely in the right. More and more is medicine coming to use the principles, the methods, and even the apparatus of physics and chemistry both in diagnosis and treatment. It is impossible to say that such and such parts of physics are good training or are useful and the rest of small value. Besides, who is to judge? In the replies quoted above we find such suggestions as these: Place emphasis on sound, light, and

electricity and magnetism; place emphasis on mechanics of fluids and gases, light, electricity; special attention should be given to theoretical mechanics, and to mechanical and electrical experiments. We have here the whole field of physics included.

The plea for thorough training in physics from the standpoint of pure science does not come wholly from the faculties of arts and science. Many of the strongest medical schools urge the same thing. We have even one case of a dean of the college department urging vocational physics for students of medicine, while the dean of the medical deparement prefers the regular course.

If it is desirable that a man should be able to do independent thinking, based upon exact dependable knowledge of the facts, methods, and principles of physics or the other fundamental sciences, there can be little question but that he will get the greatest benefit in courses taught from the standpoint of pure science. In short, the kind of physics course that is best for students of medicine, or any one else who expects to use it, is that course in which he gets the most physics.

2. Here again the majority of the institutions have taken the right stand. Physics without trigonometry may be a most excellent high-school course, but it is not college physics. An excellent cultural course in physics without trigonometry might be given in college for students in the languages, philosophy, psychology, etc., to acquaint them with its broad generalizations, methods, and results, but it would not be the kind of physics any one could use. Knowledge gained in such a course would not be intimate, exact, and dependable in new situations.

There is, apparently, a mistaken idea that trigonometry is advanced mathematics. On the contrary, it is as elementary and as useful as any branch of mathematics, save perhaps arithmetic, and is by far the most easy to learn. It may be learned in a very few weeks, and its acquirement as a prerequisite to the subject of physics is to make a real grasp of the subject easier, not harder. Its employment enables the attainment of insight and results with speed and directness where otherwise tiresome and involved circumlocutions would have to be used.

The fact that trigonometry is not generally taught in the high schools is no bar to its requirement as a prerequisite to college physics in those schools which are on the two-year college basis. It is a difficulty for those schools on a one-year college basis. If the Association holds to one general set of entrance requirements for all schools and makes the minimum one year of college work, then trigonometry cannot be required. If the requirement in physics can be met without trigonometry then the word "college" should be dropped from the specifications for physics, and it should be stated frankly that the requirements may be met with high-school physics as taught in a regular four-year high school.

Whether the Association should attempt to say what constitutes college physics is open to very grave dobut. It is within its province to say that it is satisfied with high-school physics or that a certain amount of college physics shall be required, and that it prefers the broadly scientific course or a vocational course. But if "college physics" is specified, then it should preferably be left to the teachers of physics to decide what its content should be, and there is little doubt but that the sentiment in favor trigonometry as a prerequisite would be overwhelming.

3. In regard to the more definite specification of the work in physics, we find, out of twenty replies mentioning the subject specifically, that six favor no prescription of the course, three favor specification in general terms only, seven want it partly specified, and four want a complete outline, lecture and recitation hours, laboratory hours and even a syllabus of experiments. Hence, we have six for no specification and fourteen for specification in whole or in part.

There seems to be no particular reason why the course should not be specified, since a good many seem to wish it, provided it is done in consultation with teachers of physics. At least there is no particular harm to be done. The best plan would seem to be to describe the amount and kind of work desired in general terms only and leave individual teachers a chance for initiative. The strong teacher will pay little attention to it any way, except to see that his work is fully equivalent to that called for. There is the possibility that the weak teacher may be helped in building up his course, though there is also the chance that some teachers might follow a definite outline slavishly.

The argument that unless the laboratory course in particular is fairly well specified, much of the college work may be shoddy, has considerable force. Any number of experiments might be given, having no particular value from any standpoint. But this is a matter depending upon the professional training and point of view of the teacher. The well-trained scientific man needs no detailed directions; the poor one does, but there is no way of seeing that he does proper work, even if the course was laid out for him day by day. If the Association accepts in principle the statement that the best training in the fundamental sciences is that obtained in thorough, broadly scientific courses, the question of the specification of the course in physics may very well be dropped. If it takes the view that vocational courses are desirable, then they should be specified in some detail.

The report was discussed by Drs. K. C. Babcock, J. M. Dodson, G. M. Kober, W. F. R. Phillips, D. N. Eisendrath. It was suggested that inasmuch as the subject-matter of the report had been fully considered by the Executive Council and the Council on Medical Education of the A. M. A., and as the latter had proposed the appointment of a committee to consider the questions propounded in the report, no action should be taken on the report at this time. It was moved, seconded and carried that the report be referred to this committee to aid the committee in its work.

Dr. Means, on behalf of the Council, presented the following:

The Executive Council recommends cooperation with the Council on Medical Education by appointing a representative to serve on a joint committee of the Council and this Association, and Mr. K. C. Babcock, formerly specialist in higher education of the U. S. Bureau of Education, for the purpose of formulating a detailed report setting forth the best methods of administering the entrance requirements of medical schools, and the adjustment of such requirements to existing conditions.

On motion of Dr. Cutter, the recommendation was adopted, and the Chair appointed Dr. F. C. Waite, the representative of this Association, on the committee.

REPORT OF EQUIPMENT COMMITTEE

In the absence of the chairman of this committee, the report was read by the secretary.

There seems little to modify in the report of the Council of Aug. 10, 1914, which defines the essentials of an acceptable medical college equipment.

With the definite tendency toward limitation of laboratory work to one and one-half years it would be desirable to insist upon a few full-time instructors in the clinical years. The clinical laboratories should be more closely in touch with the laboratories of the first years to admit of better correlation of work.

Not only should the departments of anatomy, physiology, pharmacology, biological chemistry and pathology have properly equipped laboratories, but a budget should be provided sufficient to furnish apparatus to men who desire to carry on special research.

The requirements demanded of the out-patient department are too low. Even for the instruction of small classes a daily attendance of 200 patients is required.

HERBERT C. MOFFITT, Chairman.
(Signed) G. LUSK.
C. R. HOLMES.

REPORT OF COMMITTEE ON MEDICAL RESEARCH

The chairman of the committee being absent, the report was read by the secretary.

The report of the Committee on Medical Research was then called for and in the absence of members of the committee, the secretary read the following report:

The members of this committee feel that the committee as an independent agent is superfluous in that its functions are practically those of the Committee on Research Defense of the American Medical Association. Moreover, as two of its three members are also members of the latter committee, it can only repeat, without adding force to, the work and recommendations of the larger A. M. A. committee.

Those who have been intimately concerned in combating the legislative activities of the antivivisectionists in Massachusetts, New York and Pennsylvania and their criminal prosecutions in Pennsylvania are convinced that in order to meet these attacks and at the same time to educate the public concerning the methods of the experimental medical sciences and the objects of research

in medicine, research defense forces must be thoroughly organized and a machinery for cooperation perfected.

The best way of perfecting such organization would appear to be by the formation of state committees cooperating with the Research Defense Committee of the American Medical Association, which should be the guiding body.

Your committee therefore recommends that its services should be placed at the disposal of the Committee on Research Defense of the American Medical Association and that hereafter it work in cooperation with that committee.

If such an arrangement is not agreeable to the Association, your committee makes the alternative recommendation that its membership should not include members of the A. M. A. committee.

January 25, 1915.

(Signed) R. M. PEARCE, Chairman.
W. B. CANNON.
A. J. CARLSON.

On motion, this report was referred to the Executive Council for consideration of the recommendation contained in the report.

REPORT OF DELEGATE TO COUNCIL ON MEDICAL EDUCATION

Dr. Means presented his report as follows:

As your delegate to the Council on Medical Education of the American Medical Association, I wish to report that I have been in close touch with the educational work of the Council during the last year. I attended the annual executive meeting of the Council, December 27, and one held Monday evening, February 15. During the year several joint inspections of colleges, members of the Association, and of those seeking admission, were made. We found these inspections very helpful and satisfactory. They are much better than inspections made independently. In some instances the independent inspections have led to criticisms of the individual inspector, but when made jointly, the reports seem to be much more satisfactory.

As long as the Association of Colleges confines its work to pedagogical lines, maintains high ideals and sustains friendly relations with other organizations working toward the elevation of medical education in this country, its usefulness and helpfulness will be of great value.

I recommend that the friendliest relations and the fullest cooperation should be maintained with the Council on Education of the American Medical Association and the Federation of State Licensing Boards.

(Signed) W. J. MEANS.

Dr. Zapffe, the delegate to the Federation of State Medical Boards, reported that inasmuch as the Federation met on the same day last year that the Association held its meeting, he could not attend, and therefore had no report to make.

The Auditing Committee reported that they had examined the accounts of the treasurer, and found them correct.

The Executive Council reported that it had considered the resolution presented by Dr. White, and moved its adoption. Further, that the colleges in membership in the Association be requested to give this matter the fullest consideration.

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

The Council also reported that the recommendation of the Committee on Medical Research had been considered carefully, and that the Council recommends concurrence in the suggestion of the committee and that the committee be instructed to take the necessary steps to secure the cooperation referred to in the recommendation.

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

Drs. Lyon and Waite here presented the following memorial for Dr. Egbert Le Fevre, whose untimely death occurred shortly after the 1914 meeting:

MEMORIAL TO DR. EGBERT LEFEVRE

On motion of Dr. E. P. Lyon, seconded by Dr. F. C. Waite, it was resolved that the following memorial to Dr. Egbert Lefevre be spread on the minutes of this Association:

He was a man of integrity and character, who deserved and gained the confidence of his fellows.

He was a physician of ability and a teacher who recognized the responsibility of his calling.

He was an administrative officer of rare judgment and human quality.

He was a most valued member of this Association, and its success is due in no small degree to the welding influence of his personality, his tact, his moderation and his belief in continuous, conservative progress. In various capacities and as president he faithfully served the Association.

We deeply regret his untimely death.

On motion, all those present arose and stood in silence for one minute as a mark of respect to the memory of the late Dr. Le Fevre.

Dr. Wm. P. Harlow moved that Dr. J. R. Guthrie, late Dean of the Medical Department of the University of Iowa, a representative of that institution to these meetings for many years, an ex-president of the Association and a faithful and able worker for the welfare of the Association, be elected to associate membership.

The motion was seconded by Dr. Winslow and carried unanimously.

The secretary was instructed to cast the ballot of the Association for Dr. Guthrie's election to associate membership, which he did, and the Chair declared Dr. Guthrie duly elected.

The secretary stated that Dr. John Sundwall, the representative of the University of Kansas, had prepared a paper on "The Modern Trend in Relationships Between the College and Medical School," but that owing to the fullness of the program the paper could not be listed. He suggested that the paper be read by title and published in the Transactions. A motion to that effect was made by Dr. French, duly seconded and carried.

The Chair here called for the president-elect, Dr. Bardeen, to take the Chair. Dr. Bardeen addressed the Association briefly, expressing his thanks for the honor conferred on him, and pledging his support of the various activities of the Association. His remarks were received with hearty applause.

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

(Signed) ISADORE DYER, President.
FRED. C. ZAPFFE, Secretary.

MINUTES OF THE ORGANIZATION MEETING OF THE EXECUTIVE COUNCIL

At 5:30 p. m., February 17, 1915, the following members of the Executive Council met in the Florentine Room of the Congress Hotel: Wm. J. Means, Randolph Winslow, F. C. Waite, Isadore Dyer, Charles R. Bardeen and Fred. C. Zapffe. Dr. Samuel W. Lambert was absent.

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

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

On motion of Dr. Winslow, seconded by Dr. Bardeen, an honorarium of five hundred dollars was voted to the secretary-treasurer for the ensuing year, and two hundred dollars to the chairman of the Executive Council.

It was moved by Dr. Dyer, seconded by Dr. Bardeen, that on approval of the chairman of a committee, any expenses incurred by the committee be paid by the Association. Carried.

The Council then adjourned.

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

OFFICERS AND COMMITTEES FOR 1915-1916

President: Dr. Charles R. Bardeen, Madison, Wis.
Vice-President: Dr. Reuben Peterson, Ann Arbor, Mich.
Secretary-Treasurer: Dr. Fred. C. Zapffe, 3431 Lexington Street, Chicago, Ill.

EXECUTIVE COUNCIL

Dr. Wm. J. Means, 715 N. High Street, Columbus, Ohio.
Dr. R. Winslow, Baltimore.
Dr. F. C. Waite, Cleveland.
Dr. Samuel W. Lambert, New York, N. Y.
Dr. Isadore Dyer, New Orleans.
Dr. Charles R. Bardeen, Madison, Wis.
Dr. Fred. C. Zapffe, Chicago.

COMMITTEES

Committee on Education and Pedagogics

W. P. Harlow, Chairman, University of Colorado, Boulder.
K. C. Babcock, University of Illinois, Urbana.
R. D. Coale, University of Maryland, Baltimore.
I. S. Cutter, University of Nebraska, Omaha.
W. F. R. Phillips, University of Alabama, Mobile.

Committee on Equipment

George Blumer, Chairman, Yale University, New Haven, Conn.
John L. Heffron, Syracuse University, Syracuse, N. Y.
Paul G. Woolley, University of Cincinnati.

Committee on Medical Research

R. M. Pearce, Chairman, University of Pennsylvania, Philadelphia.
W. B. Cannon, Harvard University, Boston.
A. J. Carlson, University of Chicago.

MEMBERS

ALABAMA

University of Alabama, School of Medicine, Mobile.

CALIFORNIA

Leland Stanford Junior University, Department of Medicine, Palo Alto and San Francisco.

University of California, Medical Department, 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 Medical School, New Haven.

DISTRICT OF COLUMBIA

Georgetown University School of Medicine, Washington.
George Washington University, Department of Medicine, Washington.
Howard University, School of Medicine, Washington.

GEORGIA

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

State 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

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

MARYLAND

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

MASSACHUSETTS

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

MICHIGAN

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

MINNESOTA

University of Minnesota, Medical School, Minneapolis.

MISSISSIPPI

University of Mississippi, Medical Department, Oxford.

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, Medical Department, Buffalo.

NORTH CAROLINA

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

NORTH DAKOTA

University of North Dakota, College of Medicine, University.

OHIO

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

OKLAHOMA

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

PENNSYLVANIA

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

TENNESSEE

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

TEXAS

University of Texas, Department of Medicine, Galveston.

UTAH

University of Utah, School of Medicine, Salt Lake City.

VERMONT

University of Vermont, College of Medicine, Burlington.

VIRGINIA

Medical College of Virginia, Richmond.

WISCONSIN

University of Wisconsin, College of Medicine, Madison.

PHILIPPINE ISLANDS

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

AFFILIATED MEMBER

Meharry Medical College, Nashville, Tenn.

ASSOCIATE MEMBERS

Dr. Jas. R. Guthrie, Dubuque, Ia.
Dr. Geo. H. Hoxie, Kansas City, Mo.
Dr. W. F. R. Phillips, Mobile, Ala.
Dr. Henry B. Ward, Urbana, Ill.
Dr. Fred. C. Zapffe, Chicago, Ill.

HONORARY MEMBERS

Dr. George M. Sternberg, Washington, D. C.
Dr. Henry S. Pritchett, New York, N. Y.
Mr. Kendric C. Babcock, Urbana, Ill.