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ADDRESS OF PRESIDENT

BASIC PRINCIPLES OF CLINICAL TEACHING

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Because of a growing conviction that present day clinical methods failed to prepare more than reasonably well for general practice, a series of inquiries was inaugurated paralleling to some extent the investigation reported by Dr. George Blumer in an address before this Association in 1920. The inquiry disclosed that of the graduates of the past five years, of a selected group of schools, approximately 80 per cent had entered general practice, and that they were compelled to learn many of the fundamental procedures of practice by experience not altogether agreeable or profitable.

A question was asked which would lead the practitioner to state freely wherein he felt his alma mater had failed—either through omission or commission. The replies received fell into four general categories:

First.—That a large part of the time of the undergraduate is wasted in the clinical years in studying rare cases which as a class will probably not be seen again by 50 per cent of medical graduates;

Second.—Failure of clinical instructors to emphasize the management of the case.

Third.—Inability of the graduate to diagnose and properly handle cases of common, ordinary ailments, that great bulk of cases that constitutes office practice.

Fourth.—Inadequate emphasis on therapeutics.

1. All will acknowledge the tendencies of many clinical teachers to hold "interesting" clinics by showing rare and unusual cases, and of dwelling on the importance of rare conditions. If clinician "A" holds such clinics full of "interest" and "instruction" (for him), so does clinician "B" strive to show

cases equally rare and "interesting." Is this tendency growing and is it each year consuming too large a share of the time devoted to clinical instruction?

2. Emphasis in clinical teaching has been placed on diagnosis. Once the diagnosis has been made, the clinical teacher too often loses interest in the patient, and although unusually careful management may be required, he fails in this particular. The management of every case should be the thing emphasized.

Too frequently the clinical presentation of the case will be fragmentary, due to the personal interests of the clinical teacher. One will emphasize the pathology of the case under discussion and feel that he has given the students all that is necessary when he has consumed half or two-thirds of the period with a discussion of the underlying pathology. Another clinical teacher will consume an equal amount of time in the discussion of physical findings. Rarely are clinical teachers with a therapeutic bias appointed to give clinical lectures. The thing desired is an approach to the case on the part of the instructor that will result in giving the student as definite an idea as it is possible to convey of complete "management." Management means a comprehensive understanding of the condition, the handling of the patient himself, and the application of those factors which will restore the patient to normal health. An isolated foot or two of a one-thousand foot reel of film would give one a very inaccurate idea of the trend of the story; in like manner, the study of only one phase of a given case, no matter how intensive, will result in giving the student but scant preparation for practice.

3. A graduate of 1918, an excellent student, cites that all important but neglected subject, acute tonsilitis. He writes:

> "The graduate has a pretty clear-cut idea of the differential diagnosis between acute tonsilitis and diphtheria. He knows the direct procedure in case his culture is positive or there is clinical evidence of diphtheria. On the other hand, the management of a case of acute tonsilitis is almost a blank in the graduate's mind. I mean the exact and correct management. One learns the proper procedure in general practice, usually after having mismanaged a number of cases."

4. The fourth point emphasized is the lack of training in therapeutics. Materia medica may never again be mentioned in

the medical curriculum once the course in pharmacology has been passed, and therapeutics, save for a few "pet" prescriptions of clinical instructors, is really a misnomer. Teaching internists are prone to ride therapeutic hobbies, and should a student attempt an outline of the therapeutic management of almost any disease entity, he finds himself in hopeless confusion. For example, there is frequently wide disagreement within any department of internal medicine. There should, of course, be different opinions, even as to management. Students should have different points of view, as an exercise in developing judgment and discriminating thinking. But what exercise of undergraduate judgment will lead out of the therapeutic wilderness when various instructors present four or more widely differing plans for the management of gastric ulcer, of chronic interstitial nephritis, of pneumonia, of heart failure, etc.? Is the undergraduate capable of selecting the important from the mass of dogmatic detail?

The factor that looms largest in outlining the essentials of good clinical teaching is the teacher. Effective clinical teaching must necessarily be measured by the knowledge, the enthusiasm, the broad human sympathies and the teaching ability of clinical instructors.

There may be from seventy to a hundred members of a given medical faculty. Of these, possibly 10 per cent will have natural teaching ability. A much larger percentage may, however, become excellent teachers, teachers of the first rank, through the application of the principles of pedagogy.

In teaching ability, European teachers of medicine, as a rule, are far in advance of American teachers. Attention paid to the manner of presenting a clinic, the order and sequence, the correlative possibilities, the historical setting of the subject under discussion, the citing of similar types from hospital or outpatient charts; pathology from the museum, plates and references from the library,—all handled without repetition, without back-tracking, without verbosity,—will make for real instruction. Under suggestive encouragement, instructors who are invaluable because of special knowledge, from negative forces in the classroom, may become teachers of positive strength.

The present-day plan of securing specialists as clinical teachers is unquestionably the best in the long run. Specialists who have

been general practitioners or who have had a training equally broad, are able to view the case as a whole, and are better qualified to give the student the correct viewpoint. Specialists too frequently handle clinical instruction without relating their specialty to other important clinical conditions. We cannot dispense with the specialist as a clinical teacher. We can, however, seek the teacher who has the broadest general training; one who will admit that the patient may require study from other angles than his own.

At the present time, many of our clinical teachers are not sufficiently well trained in the preclinical sciences. The result is that the student retains only those facts which are concrete and which to him illuminate the subject in a broad way and he forgets and ignores many of the basic principles of the fundamental sciences. There is no more certain way of ruining the student's attitude toward the strictly laboratory sciences than to place over him a teacher of internal medicine who cannot think in terms of physiology. In departments where clinical teachers of the older type abound there must be brought to the clinic instructors from the preclinical departments. If these particular instructors are medically trained they will add greatly to the force and the effectiveness of the teaching clinic. Students and instructors alike too infrequently realize that clinical medicine is, after all, but the application of chemistry, physics and biology to disease.

Next in importance to the clinical teacher is the patient. It is perhaps an extreme, though perfectly tenable, position that adequate training for the practice of medicine may be given in a properly organized and equipped outpatient service. Outpatient teaching, if properly conducted, nearly approaches the ideal. It can have all the advantages of the old preceptor system. The assignment of clinical teachers to outpatient duties should be considered the greatest opportunity that can be offered, the relegation of younger and inexperienced instructors to outpatient teaching totally defeats the end sought. If experience and maturity of judgment are anywhere required in the entire scheme of clinical instruction, that place is in the outpatient service. The student cannot but be impressed with the acuteness, the resourcefulness, the broad sanity and the great fund of ready information exemplified in the experienced clinical teacher. Sir Harold Stiles

of the University of Edinburgh says that he can conceive of no inducement which would lead him to accept a professorship of surgery in a medical school unless he could have in connection therewith an outpatient service and an outpatient clinic. He regards his Tuesday morning hours occupied wholly with cases from the outpatient department, as the most valuable period in his teaching week.

No phase of clinical teaching appears to develop observation better than the semiformal outpatient clinic. This clinic is conducted by the professor or one of his first assistants, who presents cases which have been previously fairly thoroughly worked up by assigned students. The instructor gives the students a few minutes to observe the case intently, then questions are asked which place the entire group on the alert. Facts and principles which may have been hazy are firmly fixed in the student's mind through the necessity of immediate use and his training in diagnosis and treatment progresses rapidly because he is now applying previously acquired knowledge. He is learning to think.

The student sees in the outpatient service the beginnings of disease which it is most essential that he learn to recognize. The hospital patient, though studied intensively, will never be able to teach the student the recognition of early symptoms, for he has reached the hospital weeks or months after early symptoms have disappeared. Sir James MacKenzie has pointed out the failure of clinical teachers to study the subjective symptoms of the patient, thus leading to a diagnosis before objective symptoms become apparent.

Are the colleges of this Association keenly conscious of the possibilities that lie within the scope of outpatient teaching? Have we not rather assumed that clinical teaching could be better done, and, therefore, should be done, in the hospital, when the exigencies of the situation point to the exact reverse? In a properly conducted outpatient clinic, the student learns not only the proper management of the case from the medical and surgical point of view, but he acquires that human attitude which gains the confidence and the full cooperation of the patient. He learns to consider the patient in his economic and social setting, in his community relations, and obtains a new viewpoint in his study of

environmental disease. He learns to treat the patient as well as the disease.

Clinical study presupposes a ready knowledge of those technical manipulations required in the usual examination of a clinical case. The student must definitely be able at the beginning of the second semester of the junior year (earlier, if possible), to use the ophthalmoscope, to view clearly the fundus, to recognize choke disc and to measure the swelling if swelling be present; he must be able to put a needle into a vein for the purpose of obtaining specimens of blood; he must have sufficient practice in blood counting to enable him to make a blood count quickly and accurately and a differential count if needed. The complete details of a gastric analysis should be so thoroughly grounded that reference to a textbook is wholly unnecessary. The same may be said of kidney function, tests, etc. This knowledge of clinical pathologic procedures must be ready and immediate.

Any plan of organization of clinical teaching must provide ample supervision for practically all assignments. Even cursory observation leads one to doubt the wisdom of the English plan of placing responsibility to so large an extent on the student. The ideal pedagogy of clinical teaching presupposes only the patient, the student and the laboratory. The presence of the instructor in clinical Utopia would be required only at rare intervals to suggest or correct, and thus conserve time.

While the ideal has produced and will continue to produce strong independent thinkers, it cannot function to the best advantage with approximately two-thirds of a given class. Independence may be permitted in clinical work by the particular instructor, who, we will say, supervises clinical clerks, only insofar as he finds his students utilizing their time to the fullest. Breathing spaces in the clinical schedule for absolutely independent work should be provided only to such an extent as can be measured by the productive consumption of oxygen, care being taken that the gas consumed is not nitrous oxid. The freedom allotted the student under the English system, which has been and still is advocated by many educators in this country, has a definite tendency, in a large percentage of their students, to develop irresponsibility, carelessness and habits of indolence. The student who

has the ability to organize his work and who will conscientiously use his time to the fullest is the unusual student.

If we can add to our present splendid opportunities for clinical teaching that attention to detail, that nursing care of the sick, in which the physician of a generation or two ago was so well grounded, we will double the efficiency of our present day medical graduates. In connection with the ward walks, though possibly in a special course of demonstration, there must be taught those nursing procedures which are so fundamental in the successful management of a case. Among these should be mentioned post-operative care, including the handling of the post-anesthetic condition, the amount of liquid to be given by mouth or otherwise, its character, temperature, etc.; the tupe and the discriminating use of laxatives; when food may be safely given, what food, in what quantity and with what frequency; the treatment of sleeplessness, of pain, vomiting, gastric dilation, bed sores; the method of bathing the patient, in fact, a score of procedures usually omitted in clinical teaching.

To render concrete the foregoing generalizations, the following outline of clinical teaching is tentatively proposed:

A. Outpatient Service. *Junior Students*—Twenty weeks' service required. Students may elect special services or repeat a service by election. Cases assigned in departments to two juniors for complete history, physical and clinical pathological report. Same two students continue in charge of case on all subsequent visits.

Senior Students. Twenty weeks required. Assigned to junior teams as leaders. Report cases to instructor and introduce cases to outpatient clinic of professor. Responsible to instructor for accuracy of records, follow-up, diagnosis, management. Must demonstrate case in outpatient clinic of professor when called upon to do so. On assignment, out-calls and outpatient obstetrical service.

B. Hospital Service. 1. *Clinical Lecture. Medical; Surgical.* For both junior and senior students with separate instructors. Cases from wards—each presented from standpoint of diagnosis and management. Surgical cases—preoperative or post-operative. In senior clinical lecture, clinical clerks called to lead

in discussing case. Two such exercises each week—each class—both services.

2. *Ward Walks; Seniors.* Conducted with rotating sections of not more than fifteen students—four times a week for follow-up presentation of cases previously discussed at clinical lecture. Four ward walks simultaneously — medicine, surgery, obstetrics and pediatrics—operative clinic. Progress and changes in treatment principal points for discussion.

3. *Clinical Clerks.* Under a definite outline, working in pairs, clinical clerks are assigned from two to four cases each week. The work of the clinical clerk presupposes intensive study; this includes library, laboratory and clinical findings. Each clerk report should contain a reasonable review of the literature with two or three short abstracts of important articles. The report is graded on the possibilities presented by the case assigned as well as upon the work actually performed. Clinical clerk rounds conducted with groups of approximately fifteen students on regular medical and surgical clerk service. New cases are presented, possible line of study suggested. Clerks assigned follow the cases until discharged. Should the case go to autopsy they assist at autopsy and protocol must be part of clinical clerk report.

4. *Operative Clinic.* This is of value only to students in groups of no larger than a regular ward walk section. Best conducted by a senior surgeon discussing the case, permitting the actual operative work to be carried on by a junior surgeon.

SUMMARY: While the general subject of clinical teaching may be hackneyed, yet harm cannot reasonably result from the emphasis of certain clinical shortcomings. Reiteration even may accomplish something.

Clinical Teaching Opportunities Must Not Be Neglected.

First. Greater emphasis on outpatient teaching—with better organization and with senior teachers,—the welfare of the patient being boldly in the foreground.

Second. Greater emphasis upon those diseases that constitute 75 per cent of the practice of the general physician.

Third. Teaching as a part of the ward walk, many so-called nursing and diatetic procedures.

Fourth. Develop clinical teachers.

Fifth. Complete management for every teaching case.

AN EXPERIMENT IN INTERDEPARTMENTAL CORRELATION

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The modern medical student as he takes his courses in biochemistry, pathology, physiology, etc., has gradually unfolded before him a set of mental pictures. These pictures represent the last word of the specialist, let us say, in each of the respective subjects. The physiologist attends to the last detail in the construction and delivery to the student of the physiologic picture—even including its framing. Then, figuratively speaking, he stands off for a moment, arms akimbo, to give it a final inspection, after which, with a sigh, in which are mixed both satisfaction and relief, he proceeds to forget about it altogether. Little is he concerned as to how or how much the picture is to be used. And what is true of the physiologist is true to an equal extent of the pathologist and the other specialists. When the surgeon complains that his students do not know anatomy, the anatomist doesn't for a moment suspect that anything about his course may need readjustment; no, the defect must lie within the student, for did not he—an expert in the field—both plan and give that course?

But while the specialist is concerned with the preparation within the mind of the student of the picture represented by his subject, what else is going on within that mind? A number of other painters or architects are engaged in a similar undertaking. Are they all working under one foreman? By no means. These men are experts. Are they all working to produce one complete harmonious picture? Well, to tell the truth, they honestly think they are, but if we examine carefully we find that there is little or no real cooperation between them. It is true they exchange greetings, or, perhaps, pause to ask a few questions as they meet now and then in their excursions after more paint, but the choice of colors and the actual disposition of them depends solely on the judgment of the individual workman.

Now we have reached the point where we realize that something is wrong. We all think we know pretty well what it is and where it lies. How to correct the defect is, however, not so simple. Let us return to the student who is, after all, the test animal. He receives these separate sets of departmental pictures and is apparently required to try to put the jig-saw puzzle together before proper use can be made of it. But here is the rub. Who is to help him put it together? He turns to the physiologist and asks a question that is a little off the beaten trail, only to be told that that is quite outside of the field of the physiologist and that if he wants such information he must go to the pathologist. Or, again, if, perchance, the instructor really tries to answer the question and correlate it with his own subject, he will very likely have to call on information in the extra-departmental field that he gained years previously and which has long since become obsolete. Such correlation is, of course, not real correlation, and the wide-awake medical student will probably be well aware of it. If he has similar experiences repeatedly, may he not soon lose interest in the problem of correlation? More than that, may not his estimate of the value of the subject matter that is being given him be seriously affected so that he prunes ruthlessly and discards right and left, not because the matter is worthless but because he is utterly unable to find a proper place for it in his "picture?"

Why is it that we have ever reached such a state of affairs? In the days when the student of medicine served his apprenticeship no one ever thought of the term "correlation." Correlation of the subject matter was practically automatic, because all the student's information came from a single source and no one fact or opinion was given him without reference to other facts and opinions that had been given to him previously.

Nowadays, however, things are different. With the gradual acquisition of an enormous fund of facts and observations and an accompanying increase in the complexity of technical procedures there has necessarily come, because of human limitation, a specialization that would scarcely have been dreamed of a generation or so ago. It is this specialization more than anything else which is responsible for our dilemma. For as it has increased, the specialist has found it more and more necessary to limit both

his time and his attention to his own particular field, while at the same time he has been progressively less and less able to keep pace with advances in other branches. In consequence, the course he teaches has become more and more an isolated entity, possibly of the highest quality when considered by itself, but very much of a misfit, indeed, from the standpoint of its rôle in the medical course. As a necessary corollary, such a specialist will be less and less able, as years go on, to serve as an integrating medium for the student who would correlate his knowledge if adequate assistance were available.

But there are other factors that are related to our problem. Along with this increase in specialization there has come not only an increase in the number of departments but also an increase in the size of each department. The consequent increase in acreage of the medical plant, with its hospital often at a distance, has introduced another important factor in the relative isolation of the specialist from his colleagues.

Add to the factors already mentioned the fact that the student is ruthlessly driven by a crowded curriculum, with all his spare time, and more, needed for outside study if he is to pass in all his work; then add the increased competition between students for places in medical schools that are overcrowded, and we have a set of conditions that make for anything but a correlation of subject matter in the mind of the student.

What do we really mean by correlation, anyway? Is it not the welding together, nay more, the fusing of the subject matter of the medical course into a single working unit? We speak of the "medical course" in the singular number. Unless the subject matter of that course can be given with a reasonable degree of fusion we are scarcely justified in using the singular. The problems of the physician present themselves as units and he will solve them only to the extent that he is able to draw on the integrated total of his training. Isolated, uncorrelated information will be of little assistance to him; he cannot use it.

So much for the general aspects of the problem. Where, in the medical curriculum, should there be correlation There seems to be rather general agreement that it is needed between the preclinical and the clinical subjects. There can be little doubt that

such a process would yield beneficial results if it were applied to the teaching of the respective clinical departments. In the latter case this need has found expression in the clinical consultation and fortunately the advances in hospital teaching have improved matters very greatly in the clinical years.

But is this all? I believe, for reasons that have already been brought out, that integration is as badly needed between the various departments of the so-called fundamental years as anywhere in the medical course.

From the practical standpoint, how is correlation to be effected? A variety of methods suggest themselves. No doubt a method that yields satisfactory results under one set of conditions might be relatively unproductive under other surroundings. Nevertheless, it is only through the application of some method or other that results may be achieved. First of all, if part of the difficulty arises from the lack of familiarity on the part of one specialist with what his colleagues in other departments are teaching, it is clear that he should use every possible means to acquaint himself with that subject matter through deliberate "contacts." What harm would result if the physiologist or the pathologist attended the lectures in some other department each year? Such a procedure could be arranged so as to require the sacrifice of a relatively small amount of time, but I believe it would result not only in an improvement in tone, but also in extensive modifications in subject matter presented, as well as in the relative stress given to many phases of individual courses. Items that had been tolerated or, perhaps, even cherished by the instructor would come to appear so out of place in the light of broadened contact and interest, that they would promptly give way to more pertinent or useful material. Unquestionably a very large measure of correlation would result, for *no teacher can "isolate" his course half so well if he knows what the other instructors are teaching.* Linkage of one course with the other would be almost automatic. The development of the possibilities for even greater correlation along this line are very attractive but time will not permit it now.

Another means for developing integration would be by interdepartmental co-operation in the presentation of subject matter to the students. Such cooperation might be by the purely

didactic method of teaching; by the use of clinical material, or by a combination of both.

There are certain factors that must be taken into consideration in the selection of a method, however, because they will affect its feasibility.

First of all, the various members of the teaching staff are interested in their own problems and a certain amount of inertia must be overcome before such a course can be either inaugurated or carried through.

Second, it required the bringing together at specific class hours of men of more than one department who may normally be some distance apart, and this takes both planning and effort.

Third, no small amount of extra effort will usually be required by each faculty member involved, because the demands on him are not under his control as they are in an intradepartmental course. The physiologist, for example, cannot anticipate the physiologic and clinical problems that may come up at the next class session without careful preparation before hand, and this requires time and effort.

Fourth, the size of the departmental staff is important. An undermanned department might be unable to assume the additional burden, for it could not be allowed to interfere with the other obligations of the staff.

Given, however, the staff, with its willingness to devote adequate time and effort, can we hope to effect a complete correlation throughout the medical course? I do not believe that we can with our crowded curriculum. I doubt whether it is either necessary or even altogether desirable. The student should be given a chance—nay, be required—to do some correlating for himself. That is what he will have to do after he graduates in medicine. If he can be convinced of the necessity for connecting up the facts that come to him from various sources before they can become of the greatest service to him; if, in addition, he can be shown how such correlation can be effected, we will have diminished measurably the defect under consideration.

In my department of physiology, efforts at interdepartmental correlation have been made for the past eight years. When the chemistry of muscle or of blood, or the mechanism for mainten-

ance of the normal chemical reaction of body fluids, has been up for presentation, the biochemist has been called in to present in from thirty to sixty minutes, if necessary, the more important points that he gave the class the previous year in their course in physiologic chemistry. This serves not only as a review of the subject matter but associates in the minds of the students other data not actually touched on at this time by the biochemist and brings it almost unconsciously into relation with the course in physiology. Moreover, the facts will be given more accurately than I could give them. The students are held responsible at examination time for material presented in this way.

Again, when heart sounds or pulmonary sounds have been under consideration, the clinician in charge of the course in physical diagnosis has been called on to give a brief presentation of the facts. Occasionally the anatomist has been asked to present a review of the finer anatomy of the lungs, the kidney, etc., preceding the discussion of their function. After the students have covered the entire field of reflexes, both by lectures and laboratory work, the head of the department of nervous diseases has given us a two-hour discussion and demonstration of reflexes in a normal subject, a hemiplegic, a paraplegic and tabetic, which serves to illustrate normal and exaggerated reflexes, absence and inequality of reflexes. During this demonstration not a word is said in explanation of the reflexes seen. The student is not even told what or where the lesion is. There has been plenty of evidence, however, that he suddenly developed a new interest in the subject; that his appetite was whetted for more and that he had an added respect for what had been given him in the physiological laboratory. Our experiences in this connection have made us feel that little difficulty will be experienced in teaching a fundamental subject if the student is convinced that what he is getting has some bearing upon his future life work.

Other efforts of similar character have been used, such as cooperation with the department of surgery in teaching something regarding anesthesia during the mammalian work in physiology, but a statement of further details of this character is doubtless quite unnecessary.

To come to the experiment in interdeparmental correlation to which my title more specifically refers, Dr. C. H. Neilson and

I, the directors, respectively, of the departments of internal medicine and of physiology, had discussed repeatedly, beginning more than eight years ago, the need for such an effort, but not until the second semester of 1920-1921 did we overcome sufficiently the inertia to which I have already referred to inaugurate a course. The ground was quite new, and inquiry of others who were interested gave little practical assistance. The plan adopted, therefore, was purely an experiment and frankly admitted as such to the students. It is now in its fourth year. Its character has been altered somewhat each year as weaknesses appeared so that now we believe it constitutes one step at least toward the unification that is so much needed.

It consists of one two-hour period per week given to juniors throughout the second half of the year. The second semester of the junior year was chosen because the students, even at the beginning of it, have had one semester of clinical work and, presumably have begun already to value more highly their fundamental courses. Moreover, they still have the two semesters of the senior year in which to apply whatever benefits result from such an effort at correlation. At several lengthy joint staff conferences the subject matter to be covered was selected and outlined and assignments given to the participating members of the staffs of the two departments. These assignments included the department heads. The plan of presentation was for some member or members of the department of physiology to present the normal physiology of the subject in hand, which included both a rapid survey of the subject matter given the class in their course the previous year and an extension of it. Following this, the pathologic and clinical aspects were presented by the head of the department of internal medicine.

Finally, came a discussion of points of special interest, points in which our knowledge is still incomplete, with attempts, where possible, to explain on the basis of known experimental findings problems that were presented by the clinician. No attempt was made to cover a large part of the field. It was deemed preferable to study a few subjects thoroughly.

From time to time we discussed at staff conferences the apparent results of our efforts. In spite of the fact that we had devoted more time to planning this course than was devoted to any other

two-hour course on the curriculum, it was the consensus of opinion among us that we were not getting results that were worth while. In attempting to account for the apparent failure to get satisfactory results, we noted that the method of presentation used served to accentuate the fact that very often there exists a tremendous gap between the experimental field and the clinical. Possibly, another reason was the fact that the physiologist was not an up-to-date clinician, and that, perhaps, the clinician was a little rusty on his physiology. At any rate, after going over the whole situation the following fall, it was decided that the didactic method required too little effort on the part of the student; that a mere parading before him of subject matter in an effort at correlation was not enough; that he must be required to dig things out for himself. As a matter of fact, since only a small part of the whole field could be treated during such a two-hour course, the student would have gained little of value unless he had become convinced thereby of the usefulness of his fundamentals and the necessity always of trying to apply that knowledge to the solution of his clinical problems.

During the past three years, therefore, the method has been essentially as follows: Three or more whole evenings have been spent in joint staff conferences. Subjects such as heart, circulation, respiration, etc., were chosen, and an outline of each worked out, covering both the normal and the abnormal. The first year each student received a separate assignment. Since then, both because of the size of classes and the shortage of class hours, the men have been assigned to work in pairs. Every man in the class, working in pairs, has to prepare and present at least one paper.

The first class period of two hours has been used to acquaint the student with the objects of the course and the methods to be followed. The librarian uses about thirty minutes to explain how to run down any given subject in the original literature—including the use of the Index Medicus, the Surgeon General's Index, various abstracting journals, etc. The importance of a full and accurate bibliography is also stressed and instructions are given as to the method to be followed in compiling it. Then a staff member discusses the preparation of the papers. This includes the preparation, first of all, of an outline which must be submitted

for criticism at least two weeks before the paper is to be read. The titles assigned for papers cannot always be made complete enough or clear enough to indicate just what part of the field is to be covered in a given paper but we can reduce duplication to a minimum if the outline is submitted before the paper has been written.

The finished paper must be turned in at least one week before reading. This makes it possible to criticise it still further and to offer additional suggestions. It also enables us to give the paper to some staff member to look over and prepare his discussion.

When the paper is called for it is read by one of the two authors and immediately following that the other student is called on for discussion. In practice, this discussion has sometimes been given without manuscript—at other times from carefully prepared notes or from manuscript. The subject matter of the student discussions is sometimes a stressing or an amplification of points dealt with in the main paper but occasionally introduces new material.

After presentation of the paper, both men are criticised before the class by staff members. Weak points and strong points are emphasized; suggestions made as to how they could have been improved (as a matter of fact, a few men each year are required to rewrite their paper entirely embodying the suggestions made at this time as to treatment of the subject, the field covered, etc.). The delivery of the speaker, his English, pronunciation of proper names, enunciation, etc., are also criticised.

Discussion of the subject matter by the teaching staff sometimes follows immediately after the presentation of the paper, but if two or three papers are closely related, such discussion is deferred until the entire group has been presented. The first year this method was used (1922) practically all the staff discussion was given by the departments of physiology and medicine, but in 1923, after a little experimenting, we began to call in the pathologist, the anatomist, the pharamacologist and others whenever problems that belonged especially in their respective fields were being treated. This feature, while requiring very little actual time of these specialists, added greatly to the spirit, the interest and the usefulness of the sessions. There was no longer any doubt in our minds as to whether or not the course was worth

while. We did feel, however, that from the standpoint of the individual student there was still one serious shortcoming. While there was no doubt that the student developed a lively interest in the part of the field covered by his own paper, nevertheless, either because of the fact that other students were poor readers, or read their paper too fast, or failed to use illustrative material, or for some other reason, we felt that the other papers were largely lost to him. For some time this dilemma seemed unsolvable, but finally we corrected it in large part by requiring that each paper be handed in at once after being read. It was then placed in the library, where it remained subject to call, the same as books and periodicals. While the students were encouraged to take notes as papers were read, they were required to abstract the papers on file in the library and were held responsible for the most important information they contained. Many of the papers proved to have real merit and more than once one of them has been the starting point for a faculty member who wished to delve into the literature covered by that paper.

The course still has its defects and we are still experimenting with it in the endeavor to improve its effectiveness. Nevertheless, we feel that after almost four years of such experimenting we have gained experience of real value. There are certain advantages both to students and participating faculty that are evident. Among them I would mention the following:

A Advantages to the students:

(1) It gives them some contact with original sources of information.

(2) It gives them some practice in hunting out such information.

(3) It gives them practice in preparing and delivering a paper.

(4) It gives a thorough review of the fundamentals, in the part of the field that is covered by the course.

(5) It tends to convince the student of the usefulness of the fundamentals and the dependence of clinical medicine upon them.

(6) His contact with research literature impresses

him with the uncertainty of much of our knowledge and hence of the weakness of dogmatic statements.

(7) This tends to develop a more critical attitude toward spoken or written statements.

(8) It serves as a sort of laboratory demonstration of correlation of subject matter which we believe is stimulating at least the better men in the classes, to try to extend on their own initiative.

(9) Dr. Neilson says he has noted a distinct improvement in senior work which he believes is directly traceable to the course in clinical physiology.

B Advantages to the faculty:

(1) It has developed interdepartmental contacts which would not have resulted accidentally.

(2) As a result it has produced a broadened interest among those who have participated in it.

(3) Any thing that brings departmental staffs together is an advantage. Intradepartmental teaching will unconsciously be better correlated. As already stated, you cannot "isolate" your course half so successfully if you know what the other man is teaching.

(4) These benefits may be obtained to some degree even in a brief course such as this, without interrupting seriously the regular routine of faculty members of other departments.

According to present indications it will require about five years to cover the entire subject matter.

Herewith is presented the list of subjects as they were assigned during the spring semesters of 1922 and 1923, together with the time it was estimated the papers would take for presentation. The reading of the paper and its discussion nearly always exceeded this allowance. In fact, it sometimes happened that not more than three papers could be completed in a two-hour period. It was felt that thoroughness was preferable to speed, however, inasmuch as the principles involved were fully as important as the subject matter, and we believe that results have justified that feeling.

CLINICAL PHYSIOLOGY

OUTLINE OF ASSIGNMENTS

Junior Class—Spring Semester, 1923

SUBJECTS	Time Allowed Minutes
I. VOMITING:	
1. The Vomiting Center	10
2. Mechanics of Vomiting	15
3. Nervous Mechanism of Vomiting and Reflexes Associated with the Act	15
4. Cerebral Vomiting and Its Clinical Causes	15
5. Toxic Vomiting and Its Clinical Causes	15
6. Nontoxic Vomiting of Peripheral Origin	30
7. Nervous Vomiting.	10
II. THE HEART:	
1. The Conducting System of the Normal Heart	10
2. Normal Cardiac Rhythmicity	10
3. The Extrinsic Nervous Control of the Heart	10
4. Normal Cardiac Nutrition	15
5. Disturbed Cardiac Nutrition	10
6. Causes and Symptoms of Acute Cardiac Dilation	10
7. Circulatory Disturbances Associated with Pulmonary Diseases. Arrhythmias.	20
8. Nodal Sinus Arrhythmia	5
9. Auricular Fibrillation and Its Clinical Significance	15
10. Auricular Flutter and Its Clinical Significance	5
11. Heart Block and Stokes Adams' Syndrome	20
12. Extrasystole..	10
13. Paroxysmal Tachycardia.	5
14. Palpitation of the Heart	15
III. BLOOD PRESSURE:	
1. Relation Between the Venous Return to the Heart and the Volume Output Per Beat	10
2. Peripheral Resistance as a Factor in the Production and Maintenance of Blood Pressure	25
3. Blood Volume and Viscosity in the Production and Maintenance of Blood Pressure	10
4. The Hydrostatic Factor in Health and Disease	15
5. The Relation of Vasomotor Center to Blood Distribution	10
6. Hypertension—Causes.	10
7. Hypertension—Effects.	10
8. Hypotension—Causes.	10
9. Hypotension—Effects.	10
10. Cardiac Efficiency Tests:	
(a) Technic of Tests	10
(b) Practical Value and Clinical Applications	15

SUBJECTS	Time Allowed Minutes
IV. Pain:	
1. Definition to Be Furnished by Each Member of Class.	
2. Nervous Mechanism:	
(*a*) Cutaneous Topography.	10
(*b*) Visceral Supply.	10
(*c*) Paths for Both (*a*) and (*b*) from Periphery to Cortex.	10
3. Can Painful Impressions Arise in Other Than Peripheral "Pain" Endings?	10
4. Role of Peripheral Receptors in Pain Production	10
5. Objective Manifestations of Pain	10
6. Reflex Effects of Painful Impressions	15
7. Referred Pain:	
(*a*) Segmental Association.	10
(*b*) Other Types.	10
V. The Regulation of Body Temperature and Its Disturbance:	
1. Sources of Body Heat	10
2. Avenues of Heat Loss	10
3. The Nervous Mechanism of Control	15
4. Normal Variations of Body Temperature	10
5. Causative Factors in Fever Production	15
6. The Relation Between Rates of Heat Production and Heat Loss in Various Stages of a Type Fever	15
7. Fever Rhythms.	10
8. Secondary Physiologic Effect of Fevers	20
9. Basal Metabolism in	
(*a*) Acute Fevers.	10
(*b*) Subacute and Chronic Fevers	10
Junior Class—Spring Semester, 1923	
VI. Kidney:	
1. *Morphology*	
(*a*) Circulatory Apparatus and Nerves	10
(*b*) Tubular Apparatus.	10
2. *Normal Function*	
(*a*) Factor of Filtration—Evidence For and Against	10
(*b*) Tubular Reabsorption—Evidence For and Against	10
(*c*) Secretion—Evidence For and Against	15
(*d*) Modern Theory of Urine Formation	15
3. *Diuresis*	
(*a*) Saline.	10
(*b*) Drug.	15
4. *Pathological Anatomy*	
(*a*) Acute Conditions	15
(*b*) Chronic Conditions.	15
5. *Pathological Function*	
(*a*) Urinary Suppression.	10
(*b*) Polyuria.	10

SUBJECTS	Time Allowed Minutes
(*c*) Kidney Efficiency Tests	20
(*d*) Blood Findings Significant of Deranged Kidney Function.	20
(*e*) Circulatory Disturbances Secondary to Kidney Derangement.	20
(*f*) Etiological Factors in Production of Kidney Diseases	15
(g) Uremia.	15
VII. Respiration:	
1. Review of Main Facts on Mechanics of Respiration	10
2. Nervous Control of Respiratory Apparatus (Both Sensory and Motor).	15
3. Chemical Control of Respiratory Center	10
4. Methods of Estimating the Tension of Alveolar Gases	10
5. The Tensions of the Respiratory Gases in the Alveoli and Blood with Their Variations	15
6. Methods of O2 and CO2 Transport in the Blood and Their Mutual Influence on Each Other	15
7. Acid and Base Balance in the Blood in Relation to Respiration.	15
8. Respiratory Quotient—Its Variations and Significance	10
9. Anoxemia:: Occurrence and Effects	10
10. Tissue Respiration.	15
11. Pulmonary Edema.	10
12. Periodic Breathing.	15
13. Asthma.	10
14. Pulmonary Lymphatic System; Morphology, Pathology and Clinical Significance.	20
VIII. The Alimentary Tract:	
1. The Embryology of the Digestive Tube.	
2. The Histology of the Mucosa of the Alimentary Tract.	
3. The Present Status of Our Knowledge as to Physiology of the Gastro-Intestinal Nervous Mechanism.	
4. Gastric Motility; Normal and Pathologic.	
5. The Normal and Pathological Activity of the Cardiac Sphincter.	
6. The Pyloric Sphincter; Its Pathology and Pathological Disturbances.	
7. Motility of the Large Intestine: (*a*) Normal.	
8. Id. (*b*) Abnormal.	
9. Physiology of Defecation.	
10. Constipation: Types, Causes and Clinical Significance.	
11. Diarrhea; Types, Causes and Possible Physiologic Mechanism.	
12. Intestinal Putrefaction; Bacteriology, Chemistry and Clinical End Results.	
13. Gastric Secretion: (*a*) Normal.	
14. Id. (*b*) Abnormal.	
15. The Bowel as an Agency for Excretion.	
16. Gastro-Intestinal Disorders Secondary to Irritations Arising Elsewhere.	

EXPERIENCES WITH MEDICAL CLINICS TO THE FIRST YEAR CLASSES

O. H. PERRY PEPPER, M. D.
Assistant Professor of Medicine University of Pennsylvania School of Medicine

This is not intended to be a paper of discussion, but rather a report of experience. It is not a presentation of the arguments for or against the giving of actual patient clinics to the first year class, although I should at once state that I am strongly partisan in their favor.

The introduction of such hours into the first year curriculum is in line with certain tendencies in modern medical education which have been frequently commented on at meetings of this Association in the past few years and need no discussion in the present connection.

Specifically some of the results to be hoped for from clinics to the first year class may be enumerated as follows:

1. To convince the student from the outset that what he is learning in the courses on anatomy, physiology, chemistry and physiology is actually of practical importance and of every-day usefulness to the physician and surgeon.

2. To instill as early as possible into the student the realization that he is a student of medicine in its all-embracing sense and that there is no hour in the whole curriculum which is not aimed at this end.

3. To commence as early as possible to develop the student's clinical sense and experience and to start him right on the road of kindly dealing with patients.

4. To amplify at times the teachings of the anatomist, chemist or physiologist on topics of limited interest to them but of greater interest to the clinician.

5. To teach the principles of medical terminology as words occur in the course of the lectures.

6. And lastly, to stimulate the interest of the students in their work, to whet their appetite for medicine and excite their curiosity.

Some of this undoubtedly is, and perhaps all of it might be, accomplished by the teachers of the so-called fundamental branches, but it is probably more successfully carried out in a hospital and by a clinician. The mere fact that the clinicians in the hospital are familiar with the fundamental sciences carries conviction to the students as to the value of the matters which are his present daily tasks.

Furthermore, it is to be remembered that there is today a growing number of nonmedical professors and assistants teaching the preclinical branches. These men naturally vary in their ability to give at least a medical flavor to their courses. Probably the value of clinics such as these which we are discussing will be greater in schools where one or more of the preclinical courses are given by teachers who do not hold the degree of M. D.

A great deal is expected of our first and second year students, often, I think, too much, and anything which can be done to help them understand what it is all about and to make it a little more digestible seems worth while. This such clinics tend to do, I believe.

I have said that this was to be a report of experience but it must be stated at once that our experience is limited to one year and a half. This means that in the Medical School of the University of Pennsylvania during the school year of 1922-1923 one clinic a week was given to each of the two lower classes and that this has been continued so far in 1923-1924.

The subjects with which correlation has been attempted are anatomy, physiology and physiologic chemistry. Anatomy continues throughout the whole first year, while physiologic chemistry and physiology each continue for but one-half of the first year, so that it is probable that more clinics will be correlated with anatomy than with the other subjects. However, of the twenty-eight clinics given in the school year 1922-1923, nine were correlated with the course in physiology, eight with anatomy, six with chemistry, and five could not properly be said to be correlated with one or the other. This division was not intentional but was simply the result of the use of whatever clinical material at hand

seemed most suitable. About the same division seems to be occurring this year.

Much, of course, depends on the clinical material available, for the presentation of a patient seems to be an absolutely essential feature. It would seem to be better to discuss one's second choice of subject, well illustrated by one or more patients, than to discuss one's first choice without. Twice, a lantern demonstration replaced patients and once necropsy material was employed.

The lecturer must keep informed as to the topics being considered in the other courses from week to week, as it adds greatly to the value of the clinic if it is correlated with a topic being concurrently considered. For this reason it seems best to place the clinic toward the end of the week. Knowing the week's topics, the lecturer can then look for suitable clinical material in the hospital wards.

Let me now give you the subjects of some of the clinics which have been given, commencing with those based on the course in anatomy.

1. Enlarged superficial lymph nodes; the importance of a knowledge of the anatomy of the lymphatics. Illustrated by cases.

2. Dilated peripheral veins; the importance of anatomy in understanding their production and significance. Illustrated by a case of varicose veins of the legs and a case of obstruction of the superior vena cava.

3. Anatomy of skull; its bearing on the explanation of a case of septic meningitis, resulting from extension of a throat infection to the middle ear, thence to the lateral sinus and meninges. Illustrated by necropsy material and anatomic specimens.

4. Anatomy of skull; its value in the analysis of a case of ophthalmoplegia, localizing the involvement of the third, fourth, sixth and the ophthalmic division of the fifth cranial nerve in the sphenoidal fissure due to metastasis of a tumor from the femur.

5. Anatomic explanation of the symptoms of aortic aneurism as illustrated by a case with laryngeal paralysis, inequality of pupils, etc.

Among the clinics correlated with physiologic chemistry the following will serve as examples:

1. The clinician's use in diagnosis and treatment of the methods of measuring the acid-base equilibrium of the body, as exemplified by the blood P_H CO_2 in diabetes, mild and severe.

2. Value of studies of enzymes in practice as illustrated by a patient with achylia gastrica.

3. Patients exhibiting altered uric acid metabolism—illustrated by a leaukemia with high uric acid output, a nephritic with uric acid retention, a patient with a uric acid calculus, and a normal rabbit which excretes no uric acid.

When, in the course in chemistry, protein metabolism was under consideration, cases of emaciation were shown. When the thyroid was the subject of lecture by the chemist cases of goiter and postoperative tetany were made the subject of that week's clinic.

Parenthetically let me say that as the member of the National Board of Medical Examiners concerned with the examination in physiologic chemistry, I have been impressed with two facts after studying the questions set in the courses in this subject being given in the various class A schools of this country. In the first place, the courses apparently vary much in type, more so, I imagine, than is true in any other subject. Topics which occupy a chief position in the course at one school are given but little emphasis at another; the same is true both of lectures and laboratory work. One reason for this state of affairs is that in the time allotted to the course in physiologic chemistry it seems to be difficult or impossible to supply both the requisite amount of the fundamental physical chemistry which most of the students lack on admission and also to emphasize the biologic applications of the various phases of the work. This is not the place to discuss this matter except to say that it is much easier to correlate clinics with a course in which the biologic aspects of each topic are fully considered. Perhaps the best way to make such a course possible would be to require more adequate premedical training in chemistry.

The topics in physiology are well adapted for clinical illustrations. An hour was spent discussing the pulsations in the neck in a case of heart block, and another on the relation of oxygen unsaturation of the blood to the cyanosis of several patients.

The value of basal metabolism estimations was easily illustrated and clinics on dyspnea and edema were given at appropriate times. When the physiology of the nervous system was being studied a clinic on peripheral reflexes and one on cerebral lesions, such as apoplexy, were arranged.

To make the manner of these clinics a little clearer, let me illustrate by going into details about one of them. Take, for example, the clinic given while the class was being lectured to on enzymes in the course on physiologic chemistry.

Opening remarks emphasized the fact that clinicians habitually test certain types of patients for the presence of certain enzymes. It was pointed out that salivary enzymes are not often tested for but the enzymes of the gastric juice and of the pancreatic juice often are tested for; the clinician is interested from several points of view; in some cases the absence of an enzyme will explain the patient's symptoms, in others it will help toward a diagnosis.

A patient was then brought in who had had an unexplained diarrhea for several years. There were few other symptoms; the physical examination was entirely negative. The blood count and urine examination were normal, but analysis of the stomach contents showed a complete absence of hydrochloric acid. In the discussion it was explained that this is anacidity rather than achylia, but that even the absence of acid has important results for the preenzyme normally is activated by the acid, and pepsin acts only in an acid medium. So that even if the enzyme were there it would not be useful in the absence of the acid; furthermore, there might be disturbances of emptying of the stomach which are, in part, controlled by the acidity of the stomach contents. Still further results may be postulated from the failure of the nonacid containing stomach contents to stimulate the secretion of pancreatic juices.

In this patient no explanation for the absence of hydrochloric acid could be discovered but complete relief of the diarrhea had been obtained by the administration of dilute hydrochloric acid with the meals.

In a second patient who had had vomiting, pain in the upper abdomen and loss of weight there was found to be a complete absence of both acid and enzyme in the stomach contents. Tests

for rennin and for pepsin were negative. The actual tests were discussed and the clinical method detailed and demonstrated.

In this patient the emaciation was marked and a swelling—a tumor, could easily be felt and seen in the region of the stomach. In this case the achylia helped in making the diagnosis of cancer of the stomach, for it is known that achylia occurs in that condition as well as in certain severe anemias.

The roentgenograms of this patient's stomach were shown and compared with those of the first patient, which were normal. The large area where the cancer had encroached on the bismuth-filled lumen of the stomach was easily seen.

The patient was operated on the next day and a report was given at the next hour.

In conclusion, it was pointed out that there was an overlapping in the function of the enzymes and that often the absence of one will produce no symptoms but that in other instances a lack of a single enzyme will result in secondary disturbances of others. Throughout the hour terminology was touched on—such words as anacidity, achylia, enzyme, ferment, neurosis, diarrhea, pylorus, carcinoma, tumor, being explained.

The contrast between the patients was pointed out; the visible tumor mass demonstrated, the method of removing gastric contents touched on, the tests for gastric enzymes and acid detailed. In closing, the value of these tests as a method of diagnosis and an indication for treatment was again emphasized.

Occasionally, it seemed impossible to illustrate the subjects of the week's work in anatomy, physiologic chemistry or physiology and then unrelated topics were selected; for example, a clinic was given on anemia and pallor, one on gross pathologic lesions, such as Hodgkin's disease, aneurysm, etc., and the last clinic of the year was arranged to emphasize the fact that fundamental sciences are important aids in diagnosis and in treatment. The cases shown included a case of Hodgkin's disease being treated with roentgen ray, one of syphilis receiving arsphenamin, one of pleural effusion requiring aspiration and one of achylia relieved by hydrochloric acid.

The difficulties of the teacher in presenting this course of clinics are considerable. He must be extremely careful in his use of words, constantly remembering that the students have as yet

no medical vocabulary at all. In one lecture my failure to define the word "effusion" led to a general misunderstanding. Not only must every new word be explained but the best results can only be obtained by using the same words, phrases, standards, diagrams, etc., that are being used by the teacher in the course with which the clinic is being correlated.

This matter of terminology may seem a small one but in my opinion it is perhaps the one most important item in the success or failure of such clinics. Practically no sentence of the usual hospital history can be read without modification.

I spent some time at first in putting the derivation of new words on the blackboard in Greek script, only to discover that only a very small number of the students knew Greek letters other than those of their own fraternities.

On the other hand, these first year students are often more conversant than the lecturer on the details of certain phases of the preclinical subjects. They acquire a transitory familiarity with formulae, quotients, insertion of muscles, etc., and the lecturer would destroy some of the desired effect if he should exhibit ignorance of any of these facts. Several fourth year students who dropped in at these first year lectures admitted that some of it was "too deep for them." It is a somewhat anomalous situation; one may discuss very elaborate chemical or physiological matters, but one's vocabulary outside the immediate topic must be very carefully limited or defined.

Similarly, the details of physical examination are wholly unknown and the routine clinical laboratory examinations such as blood counts can not be referred to without explanation.

If, however, the clinic does not "get across," it is not the fault of the audience but of the lecturer. No student audience ever tried harder or appeared more interested than does the first year class at these clinics. It is their first taste of the "real thing" and they are avidly attentive. There is no question that these clinics are enjoyed; they could scarcely be so badly given as not to be. But this is not enough to justify their existence and the giving up of an hour a week to them. Final judgment must depend upon the proof that the students gain more than entertainment from these hours. This is hard to prove; the students

say they do; the upper classmen seem to think their juniors are "getting something." Personally, I believe the clinics are worth while.

The teachers in the preclinical branches with which these clinics are correlated have been noncommittal so far; they have not told me that they had observed any good results, but apparently they approve in theory.

A further effort at correlating the preclinical sciences with clinical work is made in the second year by weekly clinics. These differ somewhat in plan from those of the first year.

In the first year the student, in addition to a background of biology and a little organic chemistry, has as yet only a superficial and detached knowledge of anatomy and chemistry. The clinics in that year must, therefore, be restricted to the clinical demonstration of an isolated chemical problem or perhaps of certain aspects of a given case. The second year student, on the other hand, in addition to anatomy and chemistry has some knowledge of physiology, is accumulating facts in pathology and is taking his first steps in clinical branches, physical diagnosis and pharmacology. His medical vocabulary has grown in proportion. The scope of the clinics can, therefore, be widened greatly. A given disease condition is presented, and largely by questions put to the students the effect of the lesion upon other parts of the body is traced in terms of deranged physiology, and these in turn translated into symptoms. Gradually a conception of a disease picture is built up.

These first and second year clinics can be given at any school which has convenient hospital facilities, and there is probably no reason why they should not be attempted even where clinical material is limited. Of course, a large supply of material is needed to be able always to illustrate just what one wishes, but with forethought and preparation something could be done with very limited hospital facilities. There is no reason why such clinics should not be given in the two year schools and there is this added argument in their favor. In the four year schools the first and second year students have from time immemorial gone to some of the medical and surgical clinics and have in this way obtained some taste of clinical matters; this is usually impossible in two year schools.

It is interesting at the end of each clinic to hear the many questions asked. Here one recognizes a doctor's son, here an exlaboratory technician. I had not expected to hear from the first year class, although perhaps I should have, that request familiar to all clinical teachers, "couldn't you devote a little more time to the treatment?"

Finally, I may say that it is for the lecturer a very beneficial course of lectures to give; he has to take a sort of postgraduate course in chemistry, physiology and anatomy, and even if he does not succeed in accomplishing much of what he hopes, he at least better fits himself to teach the upper classes and to practice medicine.

DISCUSSION ON PAPERS OF DRS. JOSEPH AND PEPPER

DR. CHARLES P. EMERSON, University of Indiana: These certainly are two of the most interesting papers we have heard for a long time in our meetings, especially those of us who are interested in medical pedagogy. Of course, there is a different point of view in each of these subjects, a point of view which ought to be discussed at length because our medical pedagogy is not good today. For too many years we have been following the false illusions and the false gods of the German physiological school, and it is time we stopped and began to teach medicine. It involves the idea that a man gropes darkly at the bedside but sees clearly in the laboratory. It is like the professor of physics in the university who begins to run the heat and light plant in his city; of course, he can do it, but why should he want to? One of our teachers not long ago said to the medical students in that connection, "Oh, follow your laboratories. You can pick up the whole of that clinical stuff in six weeks whenever you want to." That is the thing we must try to get away from.

Dr. Joseph's attempt to correlate the departments in the medical school is an important thing. I am a little bit more worried, though, about correlating the men in the same department. There may be two men, both very good, who express different points of view. We do not want our men to express a standardized point of view, but when they express different points of view we want to be sure that the student knows the reason why. The better those men are, the greater are the chances that they will more positively stick to their own opinions, and it is very important in each department to see that those different men are correlated, if we may use that term, before the medical students.

There is one other point which is very important. We may be giving the student too much; we may be feeding him a little too much predigested food. I think he has too heavy a burden as it is. In Indiana, we are trying to correlate the subject to the intern, especially in the university hospital, and to the younger members of our own faculty, especially the recent

graduates in the dispensary, for we do insist that every medical school must be a postgraduate school to its interns and the younger members of its faculty, and we must consider them just as much as we consider our own students.

We have what we term a seminar once a month. All the medical students now are required to attend, but they do not need to be required to go; they go anyhow. They more than fill the room. At that seminar the students do not speak very much, but the interns and the younger teachers are encouraged to discuss questions on the advancement of medicine and surgery and also colloid chemistry, etc. These new aspects of the subject are presented in order that at that meeting the students may see the point at which a subject is advancing, and in connection with those meetings we sometimes have a little contest for the sake of the students.

Just a week ago last night we had two good interns whom we coached to take opposite positions. One presented the case beginning with a story of the grandfather and the grandmother, bringing it down through the parents, and the effect on the patient,—working to the result. The other used the reverse direction just as he would in the scientific presentation of a new specimen in zoology. He started with the known fact, the surgeon found so-and-so, the roentgenograms showed such and such, ending with the grandfather. The students were asked to vote on which way they liked the better, from which way they got the most. The vote stood 89 to 86, and they were still talking about it when I left.

In other words, I am a little afraid of too much mechanical teaching in the course, but if the students attend these seminars and they can be required to do so, call them seminars or medical meetings or staff meetings or whatever you will, we can correlate the subject. The young assistant in physiology can present something new in his department, the biochemist can give his talks, and the students as auditors will get a great deal that will help them to correlate their subjects. I merely present that as another way of trying to do the same thing.

Dr. Pepper's paper was immensely interesting to one who believes that the art of medicine does not rest on treatment of a science; that it is a different thing; that while every clinician should have the preclinical sciences not only at his tongue's end but also his fingers' end, nevertheless, the art of medicine is something to be learned, and while every student should be well fortified for his art by all the science we can give him in order that he may be the broad man and the mentally alert man in the future that we hope he will be, nevertheless, there is an art of medicine which does not follow as a consequence of the physical sciences. That rests with experience.

Dr. Pepper has told us what he has been doing in this line. We have been doing it a little differently. I presume his way is better. We teach from the point of view of physical diagnosis, which we start in the second year, and in that we think the most important thing is to give the boys a lot of the history of medicine. Again, I make my plea for the history

of medicine that these men have a personal knowledge of the various men who stand out as great milestones in the history of medicine. Why? In order that they may know of these men? No. In order that they may know our own prejudices of today, our own partialities of today, because those are inherited undoubtedly from the past of medicine. In other words, we must teach the students and get them interested in clinical medicine early in order that they may understand an art that is an art for relief.

Then we have that other point of view which I would urge, and that is that whatever else a student learns he must learn to love his patient; he must learn to have every desire possible to help his patient; he must realize that whatever he gets from his medical course in the way of science and medicine is gotten in order that he may apply it to the relief of mankind. If we do not put that over to our medical students, then we are failing greatly in training students for our profession. I therefore, would urge with Dr. Pepper that we begin our clinical medicine early in order that the medical students may learn to use all the science that they can get to help their patients and not in order that the medical students may know a lot of science and that the patient should illustrate his laboratory work rather than that the laboratory work should help him in taking care of his patient. Just as soon as we focus his attention on the suffering man or woman, and make him want to be the best doctor he can be so that he can help them, then, I think, we will be accomplishing our function.

Dr. Wm. Darrach, Columbia University: I heartily approve of and am greatly interested in what has been reported from St. Louis and from Philadelphia. I firmly believe in this method of teaching, and I have the sincere hope that it will be carried out by a great many more of us because I feel that in this way a more proper balance can be instilled into the minds of the oncoming practitioners than in any other way, and that better balance is less of a shock to that student if it is introduced early than if he has a sudden change from what we might call the ultra-scientific attitude to the ultra-clinical attitude which so many students meet today; that is, he suddenly shifts from the preclinical to the clinical work without any bridge or gradation between the two forms. It must be done carefully, and it is fraught with danger if it is not well done.

Dr. Pepper has shown that his work is well done. He has shown us the pitfall one is liable to encounter,—of the clinical teacher being shown up as quite ignorant on some of the later developments of preclinical work. I can see how it would be necessary for most of us clinical men to pay a great deal of attention to lectures that are given in preclinical subjects lest we lead the students into a false idea as to the value of the scientific work. I think if these clinical talks are given in the first year in a proper way, there will be little danger of that evil which has been held up as an argument against it of belittling science for science's sake. I think that is an idea of which the clinical teachers in the first year should

be mindful. We should realize that in each first year class there are, perhaps, three or four potential scientists of great value, and if we lead them away from paths of pure science we are doing harm, or if we belittle the value of the scientific atmosphere in the minds of the other 95 per cent. who are going to be practitioners, again we will be doing harm. So, those who give such courses should be very careful of how they give them. I think the very best men in the school should give the courses, as has been done in Philadelphia.

DR. WM. KEILLER, University of Texas: I absolutely agree with the last remark made. I want to congratulate Dr. Pepper on having given this course successfully and on having the enthusiasm that enabled him to attend the special courses in anatomy and physiology and bio-chemistry to bring himself up to date. I recognize very thoroughly the value of this course to Dr. Pepper. I have very grave doubt about the value of the course to the student. Theoretically it is all wrong. It carries me back thirty years when we were doing all that we possibly could do to keep the students out of the clinical years until they had faced the hard drudgery of the pre-clinical years. It is tending toward that little knowledge which is a dangerous thing; it is tending toward giving them an idea that they know all about it when they don't know anything about it. The idea that you can possibly teach men anything like satisfactorily the clinical work before they have a good grasp of their basic material of anatomy and biological chemistry and pathology is going away back to the old preceptor days, and students think they are getting things; they think when they get into the hospital and see cases that they are getting something then, and they lose interest in the hard drudgery of the preclinical years. I am not converted.

DR. WM. DARRACH: I should like to ask Dr. Keiller if he were going to teach his son how to play golf how long he would make him swing a club before he would let him hit a ball.

DR. KEILLER: There is not any relation between the two things at all. It is hard enough to swing a club and hit a ball, but there is no comparison between that and preparing a man to study medicine.

DR. DAVID L. EDSALL, Harvard University: I have been interested in the correlation question for a good many years, and I have tried a variety of ways of approaching it and have encouraged other people in a variety of ways of approaching it. My general feeling about it is one partly of discouragement and partly of encouragement. There are some things that I have grown to feel are distinctly not wise and other things that would help toward it.

The one thing that stands out in my mind most prominently is that you accomplish comparatively little by a formal and self-conscious method of correlation. The thing must be done in some way that makes the student do the correlating rather than doing it for him.

I have some sympathy with a very limited application of the sort of thing that Dr. Pepper has done so well. I think it is extremely dangerous

unless it is done by a man who takes the trouble and the care that Dr. Pepper has taken to avoid being simply utilitarian in what he is doing and simply encouraging the student to skip over all the preclinical years and jump toward the clinical years as rapidly as he can. That is the very great danger in some courses of that kind that have been carried out.

When there is a very liberal amount of talking to the student about it in giving it to him, it soon becomes really a modified form of spoon feeding, to my mind. That is, the individual that is doing the talking does all the thinking for the student instead of making the student do the thinking for himself.

Among the things that we have tried in the several places where I have been as a teacher, the one thing that has stood out in my mind thus far as showing most promise of being really successful in helping to emphasize correlation has been the general examination that we have had in its present form for the past five years at the end of the fourth year, in which the questions are purely based on the idea that the student must show evidence in very general questions asked him that he as a practitioner of medicine is capable of putting together and using effectually what he has learned since the time he entered the medical school. They are such general questions as: Describe the etiologic, anatomic, physiologic, pharmacologic, or all standpoints that you wish, typhoid fever—letting the man write an essay on that and giving him four or five hours in which to do it. That may not off-hand seem to be a thing that leads to correlation in the course but it does more than anything else. The student knows that at the end of his fourth year he is coming to a time when it is the natural thing for him to be asked to correlate these things. It gets it into the student's mind from the beginning that that is what he is approaching, and what is still more important it gets it naturally into the minds of the faculty that that is what they are doing. They don't do it, then, by any formal and definite and self-conscious method, but they do it because they realize that what the course is for is to produce a practitioner of medicine and one who can clearly employ the knowledge he has gained in his pre-clinical branches in elucidating his problems. That thing shows more promise of doing good than anything else because of its effect on the faculty in making them think together.

The next thing that seems to me to have had most effect is to encourage in every way possible a community of research interest among the various departments. That is, if the anatomist and physiologist or the pharmacologist and the physiologist or the pathologist and the physiologist get a community of research interest and then the clinicians get a community of research interest in the various departments and from one department to another in carrying out problems, that causes the tendency in all these departments to be thinking naturally together and, therefore, in having an atmosphere of correlation among the students.

I think there is a very interesting evidence of that in this way: When I was looking over conditions last year in Great Britain, a thing that struck

me profoundly was that for many years Great Britain has been the dominating country in physiology, and there is less physiology, by and large, taught in the clinics in Great Britain than in this country and most other countries that I am familiar with. The reason I think becomes quite clear; the clinicians have not been much interested in physiologic problems, but are still almost solely interested in problems in pathology in relation with their clinical work. These men who have been through the magnificent courses in physiology in Oxford and Cambridge that are better than anything we give in this country pay rather little attention to physiology when they get into the clinic. Partly at least in consequence of this their students know physiology in relation to medicine less well than our students, apparently, from observing the way they respond.

It seems to me, then, that it is a question of infiltrating the atmosphere more than any conscious courses. We have developed a considerable number of details in courses; the correlation of medicine and of neurology to anatomy and the correlation of a variety of other things of that kind is going on to a very considerable extent and very advantageously, but it is within the actual course itself rather than as a separate and self-conscious course.

All these experiments that are being carried out in the various places are extremely interesting and help us to gather together a better way of going about it. These are only the main impressions that I have had after having given a good deal of thought to it.

DR. STEWART ROBERTS, Emory University: In Philadelphia last year I heard Dr. Pepper discuss this subject before the College of Physicians. At Emory University we began the work with the Sophomore class. All that he has said and his particular references to details and impressions have been my own experience. I did not realize that medical students who had had one year in college, many of whom were A. B. and B. S. graduates, could be so dull and ignorant as regards terminology. I tried the same scheme with the Greek derivations that he did, and then I took poll of the class and found that there was not a single member of the second year class that ever had studied Greek. That is quite a change in the last twenty years.

I found that our professors in the fundamental branches gave, as Dr. Pepper said, only theoretical approval, but they all admitted during the year that the student showed more interest in the fundamenal branches since this course had been begun.

We have been using the same subjects, comparatively, that Dr. Pepper used. We would devote on hour, for example, to the clinical importance of the vagus nerve, another hour to the pathology of the thyroid gland as related to its physiology and chemistry. Cases were shown from the hospital. One hour would be devoted to a case of hysterical paralysis; the patient would tell the class about her history and she would be rolled out and the case discussed, with the accent on the importance of the

functional neurosis. The next hour would be devoted to a hemiplegia with reference to the physiology and anatomy and pathology.

As the case proceeded we felt that we were dealing with the students as original sources of medical education, and so in the examination at the close of the first semester this question appeared: "Give any suggestions that would enable you to learn more as a student of medicine—any suggestions toward the improvement of the courses in medicine."

I was positively astonished at the answers given. Never have I had such a view of medicine and medical pedagogy as I received from this question.

I then took up the matter of the same question with the senior class and gave an hour to the senior class with the same question. Here are some of the suggestions received: First, that anatomy is hurried; there ought to be more time devoted to anatomy; particularly is the course on neuro-anatomy hurried. Second, there is too much frog work. Third, there is not enough time given to treatment. Fourth, the professors in th epreclinical branches are utterly out of touch with the professors in the clinical branches. Fifth, there is no book or journal that is common to all the departments. One sophomore student suggested that every Freshman when he entered the first year should be required to take the American Medical Association Journal and that it should be used as a correlating medium with all the preclinical and clinical courses, and that if there was anything in there in regard to anatomy, the professor could refer to it, and so on as regards neurology, chemistry, et cetera.

More criticism was applied to the course in physiologic chemistry than any other course. It was said that more time was spent on learning graphic formulæ and less time on relating the course of clinical medicine than any course in the whole school.

Another question that was asked was this: "Give your opinion of the importance of chemistry in medicine." That was quite well answered. We started the course accenting the different avenues in medicine; that a man could be a practitioner, a scientist, a research student, an institutional man, an army officer, and so on, and telling the importance of each of these different lines in medicine. This spring we have gone even further; we are still carrying on the work that Dr. Pepper intimated, but we have given each student two theses to write. The first is a strictly scientific thesis. He is given a thesis on the chemistry of the thyroid gland. He is told about Kendall and he is asked to write Kendall and communicate with him. He is to look up the literature; he is to use the library; he is to get up a bibliography.

Secondly, he is given a biographical thesis to write. The man who has the chemistry of thyroid gland as his thesis has the life of Charles H. Mayo to write. He is to write to Dr. Mayo, get an abstract of his life if Dr. Mayo will give it to him, keep the letter, and so on. One of the biographic thesis is the life of Dr. William Pepper, the father of Dr. Pepper who is here. He must bring out the growth of Dr. Pepper

through his first work in pathology on up to his practice of internal medicine and also his work as a man in the community and the builder of a great institution.

In the courses as much biography as Dr. Emerson accented is given. For instance, in discussing the thyroid gland and exophthalmic goiter, Graves' Practice of Medicine is passed around the class and a few pages by Graves are read to the class. Jenner's book is passed around. Larrey on "the first amputation of the hip joint" is passed around, and as much biographic medicine is filtered through the course as possible to develop a clinical flavor and accent the great epochs in medicine. We also accent what Dr. Emerson well said, that the art of medicine is the heart of medicine. For example, in going through the ward the other day I saw a heart case with the thrusting apex beat way over in the mid axilla, and I asked the student where the apex beat was. He was supposed to be one of our best students, and he said: "Why, doctor, I am sorry, but the teloroentgenogram was taken yesterday and the roentgenologist hasn't reported, but if you will wait a minute I will go down and get it." There was the apex thrust in plain sight of any living man not even a doctor. We must teach our students the flavor of internal medicine, the clinical art, which, as Dr. Emerson says, is a separate art from a mere titration in a chemical laboratory.

Dr. G. Canby Robinson, Vanderbilt University: It seems to me that this matter can be approached in a simpler way than it has been by beginning where natural correlation occurs. I want to say a word about my experience with the correlation of pathology and medicine from this point of view. We introduced clinics at Johns Hopkins at which we showed patients, illustrating the lesion that the pathologist was considering at that time. It is very helpful for the student to see the pathologic lesion in the living at the same time that he is discussing it and studying it in the gross specimen, at the necropsy and under the microscope; and it is rational, it seems to me, to start correlation here and develop it from this starting point. I feel that it might be begun in perhaps a more simple way and with less machinery, so to speak, by beginning in this manner.

Dr. J. Parsons Schaeffer, Jefferson Medical College. As a teacher of anatomy, I fear that my good friend Professor Keiller, for whom I have such high regard as a writer and teacher of anatomy, may cause the impression to go forth that all anatomists are in accord with him. I wholly disagree with Professor Keiller. I am absolutely in accord with any plan whereby the Freshman student is brought in contact with the patient immediately.

At Jefferson we are following a scheme (I am speaking now for my own subject) that I believe will work out well. For example, this week a professor of surgery is giving a clinic to the Freshman Class in which he will take up in particular the lymphatic system and certain nerve lesions, pointing out the need of knowing anatomy as referred to the lymphatic system and the nerve system. The professor of obstetrics

gave a clinic some time ago. I agree with Dr. Pepper that the clinics should be given by clinical men. I heartily believe that that is a good thing.

It may be better to have one man give all the clinics, leading to a better correlation and fitting in of the subject matter and referring back to the preclinical teachers. However, we are trying out the other plan, and I hope before the year is out to have at least six or eight clinics given which have a direct bearing upon anatomy.

I am also in accord with Dr. Edsall. In America for a long time we have believed that we as teachers of anatomy have no business to speak of anything clinical in presenting the subject of anatomy. If I inform myself on the tissue spaces, the lymphatics, the beginning of the lymphatic capillary network, how the tissue juices get into the tissue spaces and how they are removed, is there any fault to be found in a scheme whereby I present the lymphatic system briefly from the viewpoint of the anatomy, of the chemistry involved, the need of it in the living body and finally refer to a few clinical cases?

Dr. Edsall referred to this correlation within the same department and by the same teacher. I believe in that, but I would like to carry it further. I am in accord with anything that immediately makes of the student, a student of medicine, under careful guidance, however.

Dr. Charles N. Meader, University of Colorado: There is one point of view that it seems to me ought to be emphasized more than it has been; that is the effect of these correlation courses on the faculty. I cannot speak from experience, but I can speak from having given a good deal of thought to this matter. We have discussed here the effect on the students. For a long time at these meetings we have discussed the need of bridging the gap between the preclinical and the clinical courses, and I think we have rather slighted the fact that there is a need for emphasizing the value which the faculty as well as the student may derive. Manifestly in these special correlation courses only the high spots can be touched on. Most of this correlation must be carried out in the everyday routine teaching. Unless you have members of the preclinical faculty who are in touch with the clinical subjects and who realize the value of correlation with them, and unless you have members of the clinical faculty who are in sympathy with the laboratory subjects and are willing to emphasize their relation to the disease process only, slight correlation will be attained. A course of the sort described not only emphasizes the value of correlation to the students, but it emphasizes it particularly to the faculty. That is one more gap which I think we have all been trying to bridge and some of us have had the opportunity to attempt it by means of building plans which tend to throw the laboratory and clinical groups together.

Dr. C. C. Guthrie, University of Pittsburgh: It would seem, if we are to make progress, that we must stick to fundamental considerations. I am sorry that Dr. Robinson did not elaborate on this.

The first question is the so-called fundamentals. Are they so-called, as some of our clinical friends say, or are they really fundamentals to medicine? That question must be settled, and its settlement involves the time allotted to those subjects and their sequence. This is a fundamental consideration—whether the sciences are essential to the art of medicine.

The question of correlation involves a good many different things. Before we can solve the question (by "we" I mean medical faculties) the faculties themselves must have a common viewpoint; and the first step, as has been indicated, is the correlation of the laboratory subjects. After the laboratories are correlated, then they can begin to correlate with the clinical years.

Our Dean has been working on this problem and has had a series of meetings devoted to anatomy. The subject was presented at the first meeting by the Department of Anatomy, and at subsequent meetings various clinical men told what they thought about anatomy. We have not had the final discussion, so I cannot report final results. There is a disagreement of opinion in our faculty as to what should be taught in anatomy, and that is true of all the preclinical subjects.

The thing we all are aiming for is correlation of the student's knowledge. After we have educated ourselves we will be in a position to accomplish that end. Over a period of some ten or more years we have been striving in this direction, and we have crystallized a plan similar to Dr. Robinson's plan. We think the first step is the closing of the physical gap between the laboratories and the hospitals.

DR. DON R. JOSEPH, St. Louis University School of Medicine: One thing stands out clearly as a result of this discussion, and that is that we are not only dealing with a very big problem, but that there are probably a thousand and one angles from which it can be approached. I heartily agree with the statement that heretofore our whole attention has been concentrated on the question of correlation by the student. It seems to me that one of the greatest problems we must solve before we can effectively correlate is how to get our teachers into line. A clinician who has been out in practice for ten years is often so far behind in laboratory procedures that students are now being taught that he cannot correlate his teaching with that of the fundamentals. If, for instance, the student asks a question about something that has been taught him in his biochemistry it may happen that the clinician is quite unfamiliar with that particular fact or procedure, and to save his own face he may say, "Oh, forget that. You can get along without it." Of course, such a reply is damaging, and that is what I referred to when I said that through inability to correlate subject matter the student may be led to prune ruthlessly and throw away material which should be made available for use. We must bring our teachers more closely together, and that gap is not to be found between preclinical and clinical

teachers only, but between the respective teachers of the preclinical years themselves.

With regard to Dr. Keiller's view, I held the same view very strongly a few years ago, but when I dropped into the anatomical laboratory from time to time and saw how the students hovered like flies around a surgeon who happened to be devoting a certain amount of time to instructing in the course of anatomy just to keep himself brushed up, I began to wonder if after all there was any fundamental reason why the student should not receive his anatomical instruction in a form that was palatable. It struck me that he would benefit very greatly by it; that he would retain more of it, perhaps, than if it were presented to him by the orthodox dry, formal method.

I was very much delighted with Dr. Pepper's presentation. Formerly I doubted seriously whether clinical presentations could safely and satisfactorily be given to Freshmen students; now I am strongly inclined to believe that this can be done profitably if adequate judgment is employed.

Dr. O. H. Perry Pepper, University of Pennsylvania: I wish to emphasize that these first year clinics should not be formal lectures; they should be informal, with many questions and answers. I admit it takes a good deal of questioning and requestioning sometimes to drag out the information you want, but if the subject of the clinic has been properly chosen it will concern a topic recently taught and which the students have on the tip of their tongues. I have tried to exemplify this in the two sample clinics which I have published.*

Finally, I want to deny all claim of omniscience on the part of the lecturer. While he must be familiar with the subjects taught in the preclinical courses, he can not ever know all the details and he must be prepared at any time to admit ignorance. Scarcely a clinic passes without my being forced to do so, but it is much better to admit ignorance than to adopt that common defense reaction of belittling the importance of whatever is unknown. This would be very harmful and constitutes one of the many dangers which are inherent to these clinics. I agree entirely with those who have pointed out the dangers of these clinics and I would not urge the giving of these clinics if I did not feel that these dangers can with care be avoided.

*Medical Clinics of North America, January, 1923, VI, 925.

THE TEACHING OF PHARMACOLOGY

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Within the past fifteen years two special committees have made reports on the teaching of pharmacology in the medical schools of this country. In 1909 a subcommittee of the general "Committee of One Hundred" made a report at the Fifth Annual Conference of Medical Education of the American Medical Association, which presented certain recommendations and suggestions for the improvement of the teaching of the subject. About ten years later a special committee consisting of Drs. Edmunds, Sollman and Richards presented a further report on the subject before this Association.

There cannot be any doubt that both these reports have been of great value to the teachers of pharmacology as well as to more definitely determine what is essential and unnecessary in the teaching of the subject.

The influence of state examining boards has also been generally recognized, particularly in concentrating attention in examinations more and more on those drugs which are known to be of definite value.

At this time it is proper to refer to a very comprehensive article published in 1900 by Professor John J. Abel on the teaching of pharmacology as applied to medical education at that time. After reviewing it, nearly a quarter of a century later, one is impressed by the way in which his discussion of the subject fits the situation prevailing today.

This study or survey of the teaching of pharmacology in American medical schools is approached from a somewhat different viewpoint, being based on eight years' experience as examiner for the National Board of Medical Examiners, which included a considerable number of personal inspections, frequent interviews and correspondence with the different instructional staffs, impressions gained by an analysis of the questions submitted to students in the different departments of pharmacology

and therapeutics, as well as from the results of examinations, written and practical, set by the National Board.

Where the desired information was not otherwise available recourse was had to the announcement of courses of study as issued by the medical schools, fully recognizing the aptness of a remark by Dr. Abel, that "An outline of this sort is necessarily but a cold and lifeless affair, as the choice of experiments in the practical course, the number of thoroughly trained instructors, the manner in which the student is interested and stimulated to think, are all items that can not be brought out in one-half page of cold announcements, and yet these are of the highest importance."

Historical.—It would take one rather far afield to trace in detail the development of pharmacology as one of the biologic sciences, yet a few of the epochal events may be of interest.

The first great impulse was evidently given by Magendie in his classical research on the physiologic action of upas (Javanese tree poison), undertaken early in the last century, constituting the first instance of the completely successful application of the analytic method in the study of the coarser changes of function which follow the use of drugs. Toward the middle of the century the memorable experiments of Claude Bernard and of Kollicker proving that the paralyzing action of curare centers in the end plates of the motor nerves gave further evidence of the value of physiologic analysis as applied to the study of drugs.

Similar brilliant discoveries have followed from time to time, so that there are now innumerable instances of the rational analysis and at least partial comprehension of the more obvious functional changes that follow the administration of drugs and poisons.

It was experiments like those of Magendie and his successors that induced Mitscherlich (1847), and later Buchheim, to insist on the insufficiency of the mere bedside study of the action of the drugs and led to the erection of special laboratories in which experimenters could build up their science undisturbed by the intrusive demands of practical utility.

Buchheim's pharmacologic laboratory founded at the University of Dorpat, in 1849, was the first institution of the kind in the world. Later the Pharmakologisches Institut at Vienna,

under the directorship of Professor Hans Meyer, that of Professor Schmiedeburg at Strassburg and similar institutions on the continent and in Great Britain still further developed the newer methods of pharmacologic investigation.

The first full time pharmacologic chair in this country, though at that time it was called the chair of materia medica and therapeutics, was established at Ann Arbor, January 1, 1890, with Professor John J. Abel in charge.

It would be unjust to say that pharmacologic work had not been done in America prior to that time. An interesting contribution, though little known, is that of Dr. R. Cresson Stiles, published in 1865, entitled "On the Direct Influence of Medicinal and Morbific Agents Upon the Muscular Tissues of the Blood Vessels." He was interested in the problem as to how the blood, in febrile conditions, acts on the circulatory mechanism, and the work evinced considerable experimental skill.

The distinguished Dr. Horatio C. Wood, who was so long professor of materia medica and therapeutics of the University of Pennsylvania, had a well deserved reputation for scientific work in pharmacology as well as in therapeutics.

Dr. Hobart Amory Hare was made professor of therapeutics and diagnosis in the Jefferson Medical College in 1891, at which time he was already well known for his work in relation to the action of chloroform, tobacco and other pharmacologic agents.

According to Doctor Abel, the best trained man at that time in pharmacology was Dr. Francis H. Williams of Boston, who later became so well known as a medical consultant, and for his fundamental work in diseases of the chest and the use of roentgen rays. Williams, after spending a year in the laboratory of Schmiedeburg of Strassburg as an investigator, became assistant professor of therapeutics at the Harvard Medical School from 1886 to 1888, and associate professor of therapeutics from 1888 to 1891. Unfortunately for pharmacology, he resigned from the Harvard Medical School in order to devote himself to a consulting practice, and from this time on could naturally give less time to special investigation in pharmacology.

There were other men, like Bartholow, who taught materia medica and therapeutics, and who were much interested in pharmacology, but all these men, without exception, were engaged

at the same time in medical practice and could devote relatively little time to research work, however much they might be interested in it. Doctor Abel, therefore, was the first holder of the professorship in this country in materia medica and therapeutics who devoted himself from the very start entirely to teaching and research work. When Doctor Abel was called from the University of Michigan to the Johns Hopkins Medical School in 1893, he became professor of pharmacology, and this was the first chair of pharmacology (in place of the older term of materia medica and therapeutics) to be established in this country. Since 1893 the term pharmacology has been generally used in the case of all medical school appointments in place of materia medica and therapeutics.

At the present time there are well organized laboratories of pharmacology in all but one of the seventy-two Class A medical schools in this country.

It is gratifying to note that a considerable number of departments of pharmacology have been established on a full time teaching basis.

In twenty-seven medical schools the subject of pharmacology is still taught in connection with the department of physiology or of biochemistry. In five of the larger medical institutions of the country the department of pharmacology is in charge of a medical clinician.

Considerable variation still prevails in the designation of departments, as is shown by the following outline:

Combined Chairs:

Physiology and Pharmacology	19	
Physiology and Therapeutics	1	
Biochemistry and Pharmacology	7—	27
Pharmacology		23
Pharmacology, Experimental Therapeutics, Toxicology and Pharmacology		1
Pharmacology and Toxicology		2
Pharmacology and Therapeutics		6
Materia Medica and Pharmacology		7
Materia Medica, Pharmacology and Toxicology		1
Materia Medica, Pharmacology and Therapeutics		4
Materia Medica and Therapeutics		2
Materia Medica		1

In the three schools in which the word pharmacology does not appear in the title, the two institutions (Hahnemann, Philadelphia, and Howard University, Washington, D. C.), having department of materia medica and therapeutics schedule laboratory courses in experimental pharmacology, while in the University of South Dakota School of Medicine, where there is only a department of materia medica, a lecture and laboratory course in pharmacodynamics is scheduled in the second semester, second year, in the department of physiology and biochemistry. The announcement states that "practical pharmacy and therapeutics is left to the finishing schools."

Courses of Instruction.—It will be quite impossible for one individual or even a committee to suggest a plan of teaching that will be suitable for all the medical schools. Local conditions, the personality of the instructor and the student body, size of classes, and relations to clinical departments are always factors that will effect complete uniformity in courses of study.

To place the teaching of drug therapy on a scientific basis is evidently the fundamental idea underlying the generally accepted scheme of instruction, which indicates a definite unity of purpose, and explains to a large extent the decided progress made in teaching pharmacology in the last two decades.

Opinions vary on the part of medical school executives and heads of departments as to the purpose and importance of the subject in the present day curriculum, as shown by the fact that in more than one-third of the medical schools, pharmacology is considered as an adjunct to either physiology or biochemistry. These combinations of chairs no doubt influence the teaching of pharmacology from the physiologic functional viewpoint, on the one hand, or from the standpoint of the chemist, on the other.

There is the further tendency to regard the subject either as a purely biologic science, or to consider it more in its direct practical application in the treatment of disease.

One can readily appreciate the difficulties in teaching the subject in the two year medical school (of which there are eleven in the United States), where there is necessarily less opportunity for clinical application.

There are also several schools giving the full four years course, where the departments of the fundamental sciences given

during the first two years are distinctly separate, often by considerable distance, from the clinical departments, so that it is quite natural that pharmacology should be treated as a pure science.

This all leads to a difference in the conception of the subject on the part of the instructors as well as the student body.

It is interesting to note the different ways in which the subdivisions of pharmacology are considered, which is illustrated by the following outline:

PHARMACOLOGY AND SUBDIVISIONS

Time When Taught in 74 Medical Schools

	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	Total
Pharmacy	14	10	2	..	26
Materia Medica	10	35	4	1	50
Toxicology	1	14	2	..	17
Prescription Writing	..	42	5	1	48
Pharmacology	1	60	12	..	73
Therapeutics	..	..	30	16	46
Nonpharmacal Therapeutics	..	..	..	6	6

Special courses in pharmacy are given in twenty-six schools; the purpose is not particularly to teach the "making of pills," but to emphasize the essentials of compounding and to foster a better understanding and appreciation of official preparations. It is usually given in the first year preparatory to the study of pharmacology, but is also given in the second year, while in two schools elective courses are given in the third year.

Materia medica is a much abused term, and by some regarded as obsolete, yet special courses are still given in it in fifty medical schools.

While the importance of both these subjects is generally recognized, there is a strong tendency to present these matters in connection with the general courses in pharmacology. McGuigan pleads for more pharmacy and knowledge of the physical properties of drugs, while Hatcher says "A description of drugs is not necessary, but the student should identify drugs like opium."

Prescription writing is the *bete noir* in the whole scheme. Whether for lack of proper instruction or not, the average graduate in this country is sadly lacking in the art of prescribing. This has been largely held responsible for the want of progress in scientific therapy and for the corresponding invasion of proprietary therapeutics.

Fully twenty-five years ago Abel emphasized the time in the medical course when pharmacology should be taught—when the student begins his clinical studies and not before, and he states further that while it is claimed as a counter argument that pharmacology, like physiology, is so capable of illustration by laboratory experiment that it can be taught so soon as the student has the necessary preparation in physiologic chemistry, anatomy and physiology. Yet every drug has its clinical uses, and as the teacher is expected to refer to these uses, it will be impossible to avoid reference to diseases and their symptoms.

If the study is to be made interesting to the student, it seems imperative to teach pharmacology hand in hand with early clinical work.

As compared with the other fundamental sciences, pharmacology has probably done more than any of the others in bridging the connection with the clinical sciences.

In the forty-six schools giving special courses in clinical pharmacology or therapeutics, there is probably not the fullest coordination with the department of pharmacology in each instance, but the arrangements that do prevail cannot help but enhance the interest in the study, for the instructor as well as the student, and it will certainly keep prescription writing from becoming a lost art.

Examinations.—Where there is such a decided difference in courses of instruction, there will be a similar variation in methods of examination. Reviewing questions as set by the different departments of pharmacology, one finds that they range from distinctly elementary to very comprehensive, and generally are a good criterion of the course of instruction given in the particular school.

It is not possible to review the different sets of questions in detail, yet some interesting features may be noted. Many of the sets are true to the spirit of pharmacologic teaching, and have a definite clinical application, yet in no sense can they be considered questions in therapeutics.

In most of the two year schools the absence of any definite clinical reference is quite distinctive, although in this, too, there are pronounced exceptions. On the other hand, in a large metro-

politan school the final questions were distinctly clinical and hardly in keeping with the completion of the course in pharmacology in the sophomore year.

In the several schools where the final examination in pharmacology comes in the junior year, the opportunity is offered to give the questions a more direct clinical application. Naturally, where a clinican is in charge of the department of pharmacology, the character of the questions, as a rule, clearly indicate it, and in these it is noted that prescription writing is strongly emphasized.

In the final examination in pharmacology as given at the close of the second year in a leading school on the eastern seaboard, the questions seem more appropriate for a test in advanced therapeutics, yet in this institution materia medica and prescription writing is listed as a required course in the third year.

In another school of lesser prominence the final examination (ten questions) given at the close of the first year in experimental pharmacology includes the following: Give structural chemical formula of caffein, urea, diethyl ether, chloroform, ethyl chloride and epinephrin; chemical character of diphtheria antitoxin; standardization of tincture of digitalis; pharmacodynamics of digitalis, pituitary extract, epinephrin, amyl nitrite, atropin, pilocarpin and nicotine. Surely, these freshmen are entitled to our sympathy.

The final examination in second year pharmacology in the same school consists of five questions: Discuss belladonna, opium, chloral hydrate, arsenic and chenopodium, as to source, pharmacodynamics, therapeutics, toxicology, dosage and a prescription to be written for each drug.

The final examination in pharmacology in one institution included seventy-five questions of great variety and practical value with many prescriptions, yet one of the questions read, "Discuss the Council of Pharmacy and Chemistry in its relation to the young physician." This was the final examination at the close of the sophomore year!

In quite a number of instances the character of the examination questions was much more comprehensive than was to be expected from the announcement of the courses of instruction.

Taken as a whole, the questions generally show the purpose to stimulate the student to think, and, as stated before, are a criterion of the high standard that pharmacology has attained in this country.

The problem of the National Board will be appreciated in its endeavor to introduce an examination that shall be regarded as fair and comprehensive, yet be in keeping with the prevailing methods of teaching the subject in the different medical schools.

Comments and Conclusions.—While it is not within the province of this paper to propose any particular scheme for the teaching of pharmacology, it seems opportune to present herewith a diagram submitted by Professor P. J. Hanzlik, which briefly indicates an ideal and systematic scheme of preliminary and subsequent training in pharmacology for students of medicine, and those intending to specialize in the subject as followed at Stanford University.

According to the author, Dr. Hanzlik, this outline indicates the broad scope of pharmacology in both its fundamental and its practical aspects. It is evident that a proper study of and training in pharmacology precludes a preliminary training in physics, chemistry and biology, as well as intensive studies in the medical sciences, while a familiarity with clinical subjects is highly desirable if not necessary.

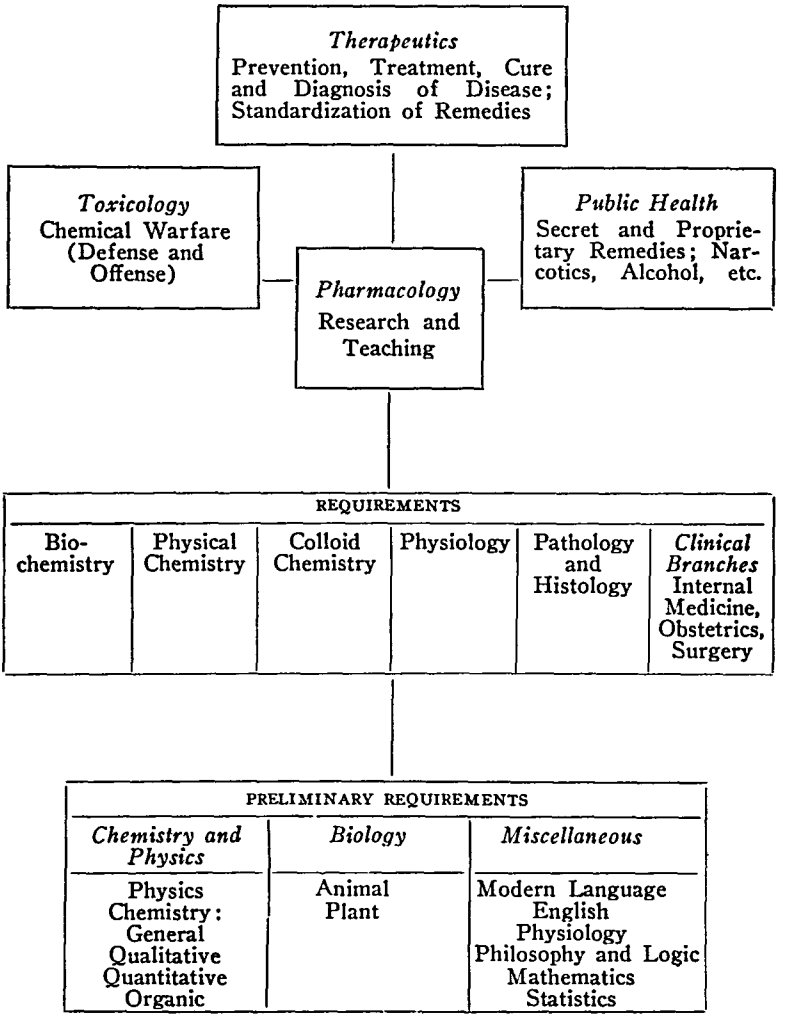
Such a training, accompanied or followed by research in and a knowledge of the problems and of the literature of pharmacology, is necessary for those intending to promote and teach the subject.

It is stated further, in explanation, that this scheme is not new or original in many of its features. It is intended to be a concrete way (or skeleton) of representing the essentials of a thorough knowledge and training in pharmacology upon which the student may build and develop his experiences and training. It is not intended to be rigid, but is subject to modification, depending on the previous experience and training of the graduate.

The hope is expressed that it may serve a useful purpose for the improvement and development of pharmacology in this country along systematic lines in order that schools of thought in pharmacology may arise in the same way as schools of physi-

PHARMACOLOGY

(Scheme of objects, training for career and teaching)



ology and pharmacology have arisen in European countries because of systematic and deliberate endeavors, thereby enriching and strengthening pharmacology and the other medical sciences.

As one of the results of this attempted analysis of the prevailing methods of teaching pharmacology, a tentative scheme of

instruction in pharmacology and clinical therapeutics is herewith submitted. This plan is adapted from the courses now being introduced at McGill University, Montreal, and is arranged as follows:

Sophomore Year.—Pharmacology: Lecture and laboratory instruction. In this course four to six lectures or demonstrations are given by a clinical teacher, showing the relation of the pharmacology of certain groups of drugs with their actual use in the treatment of disease.

Junior Year.—Clinical pharmacology and prescription writing: Amphitheatre clinics (eight to ten) on the treatment of heart diseases and certain infections like typhoid, pneumonia, rheumatic fever, and syphilis. This also includes a lecture with demonstration by the pediatrician and ophthalmologist relating to their particular field. The instructor in anesthetics can with advantage occupy two or three hours. The work in the junior year to be under the general control of the department of pharmacology.

Senior Year.—Clinical Therapeutics: Ward classes or rounds (ten or twelve) for instruction in clinical therapeutics, all types of treatment (drugs, non-pharmacal therapy, general orders, etc.) are discussed. This is under the general control of the department of medicine.

About eight or ten of the medical schools in the United States are approximating to this commendable plan, and it appears likely that it will be more generally adopted.

In conclusion, a few personal impressions or reactions relating to the matter under discussion are submitted.

In spite of the great progress that has been made in the teaching of pharmacology in the last two decades, it seems to have reached a stage where some definite, vitalizing stimulus is needed if progress is to continue.

One of the obvious reasons for this apparent inertia is the adherence to the custom of regarding pharmacology as an adjunct of physiology or biochemistry. It cannot help but have an unfortunate influence on the student's conception of the importance of the subject. Again, it practically shuts the door to

special research and investigation, and certainly lessens the attractiveness of pharmacology as a teaching career.

There was a time when, for economic reasons, such a combination of teaching departments was a practical arrangement, but it is difficult to understand why several of the liberally endowed medical schools organized within recent years continue this custom of combining chairs.

It seems strange that the great pedagogic value of the teaching of pharmacology is not more generally recognized. It is the first application the student sees of physiology and chemistry, and if properly taught serves to fix knowledge of parts of those subjects in the student's mind, just as the study of drugs has been most important in many physiological and even anatomical studies (of the autonomic nervous system, for example).

The tendency of medical education is clearly in the direction of a closer association of the fundamental with the clinical medical sciences to get away from the water-tight compartment idea or sharp division between the preclinical and clinical years of a medical course. What better opportunity is there of bridging this connection than in the field of pharmacology?

The profound ignorance on the part of the average practitioner and many recent graduates of the pharmacologic action of strong, poisonous drugs like digitalis, strophanthin and arsephenamine emphasizes the need of more thorough training in clinical pharmacology.

At a recent large clinical medical meeting, a practitioner remarked: "There is much of new knowledge as to the cause of diseases and diagnostic methods, but little of treatment or how to cure the patient."

In some respects our modern scheme of medical education reflects a similar thought.

There can be no question that the lack of recognition of the importance of pharmacology by certain outside agencies has had a decided influence upon the teaching of pharmacology in the medical schools.

As yet a division of pharmacology has not been established in the National Research Council. For some unexplained reason the department of pharmacology in the Rockefeller Institute was discontinued after the death of Dr. Meltzer a few years ago.

When one considers the great role anthelmintics are playing in the control of hookworm disease, arsphenamin in the control of syphilis and yaws, quinine in malaria, antimony compounds in schistosomiasis, etc., and how in every case better drugs are needed, it seems strange that medical institutes and schools of hygiene do not devote at least as much attention to pharmacology as to physiology and chemistry.

These are some of the problems that confront the medical teacher and require some solution if pharmacology is to maintain its dignified position among the medical sciences.

DISCUSSION

DR. HUGH MCGUIGAN, University of Illinois College of Medicine: This is too important a subject to discuss offhand. However, the paper has been well presented and does not need much discussion. I want, however, to say one or two words in defense of what Dr. Bierring has accused me of, because I know that the majority of pharmacologists do not believe in much pharmacy. The reason of that, I think, is that they do not know much about it and do not want to spend much time in investigating it.

Dr. Pepper has called attention to the fact that he could get students to answer questions about Donnan's equilibrium and hydrogenon concentration and all the other things of recent origin. This, in a measure, indicates many of the old things are not considered of much value, so they are dropped altogether. I think that is why pharmacy has been dropper or minimized. There is not time to get the old and new equally well. What I have in mind when I say that pharmacy should be studied more is that medical students and medical men should know more of plant analysis and the reaction of plant principles. That is one field of biochemistry that is relatively ignored in most medical courses. Persons that can tell you about Donnan's equilibrium do not know the composition of a volatile oil. They know nothing of alkaloids, tannins or glucosides, or many of the other things they should know, and while they can write chemical formulæ, not one in a dozen knows, if he were given an unkown substance, how to derive that formula or what the meaning of it really is. They have not reached the stage where they can philosophize or thing chemically. An amino group or a carboxyl group does not mean much, only that it is in there. Courses in pharmacology should aim at developing the student in pharmacodynamics, to the extent that when they know certain chemical groupings are in the drug studied they are able to predict, in a measure, what the pharmacodynamic action may be.

Pharmacology, as Dr. Bierring states, is one of the easiest subjects in the whole medical curriculum to teach, because when you say that curare acts on the nerve endings in a striated muscle you can state not merely that fact, but you can give the proof of it in a convincing way.

What is the proof that atropin paralyzes the third nerve endings? It is not enough to state the action, but also to give the proof of it, and in giving the proof it opens up physiology to them in a way that many of them never thought of before.

It is not enough to know that strychnine has a certain action and atropin has a certain action, and that these substances are found in certain plants, etc., but what use are they in therapeutics, and how are you going to prescribe them? How on earth are you going to tell how to prescribe unless you know something about pharmacy?

My idea in advocating pharmacy for the medical student is not merely to teach him how to roll a pill, but to show him how they are made, and to show him the use of various excipients. For instance, if he sees that a pill is held together with tragacanth, or something that may carry it through the body and render its absorption impossible, he has learned something that is of value. There are a great many things in the extraction and preparation of medicines that he cannot get without some practice in the art of pharmacy; and while it is simpler and perhaps less scientific than a study of Donnan's equilibrium, it may be just as valuable. Pharmacy for the medical student should be practical or applied pharamacodynamics.

A course in pharmacy for medical students should, perhaps, be different from a course that is given to the ordinary pharmacist. Perhaps more of the philosophy of the analysis should be put in there and more of the reasons for the things from a therapeutic point of view than he would get in a regular course.

Dr. Bierring's presentation was so complete, as I say, that little need be said about it, except this, and this applies to the other papers that have been given here: There is a great deal of fault found with the medical student as he is turned out today. He doesn't know this, he doesn't know that, and he is blamed generally for not knowing much of anything. My own impression, gained from following these men through in the hospital and in watching them in their diagnosis work and comparing them with the older men, and especially with the men on the outside, is that I would take the recent graduate every time if I wanted a diagnosis. He is far in advance of the older man at his stage of the game; he is at least ten or twenty years ahead of the older man at the same stage, so there is no need to worry about making advancement. Great advancement is going on, and each year the medical student shows a distinct progress over the one that has graduated a year ahead of him. While he is condemned for not knowing enough, he will pass a better examination in medicine generally and I think really knows more about it generally than the majority of the men that are finding fault with him. Progress is being made.

The whole question is how to lessen the drudgery in these subjects that are supposed to entail a lot of drudgery in their study. This, I think, is being done in all cases, and perhaps more advance is being

made in pharmacology than in any other subject, although it is still open to criticism. The greatest failure of the medical student today is that he can not write prescriptions, although he knows vastly more about the action of those drugs and is a far safer man than many of those who can write prescriptions with facility.

DR. C. F. MARTIN, McGill University: It was a surprise to me to see this diagram on the board this morning. The effort that has been made in our university toward the study of pharmacology and therapeutics has been an effort to make the clinical side of therapeutics correlate with physiology and pharmacology, and with that end in view the professor of pharmacology correlates his work with the clinical pharmacologist who is in the department of medicine; as a clinician then he visits the ward, and with his preliminary training in pharmacology adds his experience to the subject of clinical medicine.

DR. C. C. GUTHRIE, University of Pittsburgh: The inference from the number of combined departments, that pharmacology is often considered an adjunct, unfortunately is true. Since our school belongs to that group listed as combining physiology and pharmacology, I wish to state that the inference does not apply to it, because we consider pharmacology of the same importance as any other medical science.

DR. WALTER L. BIERRING, Examiner in Pharmacology, National Board of Medical Examiners: With regard to the remarks of Dr. Guthrie, I am sorry that I did not acknowledge in the paper that in a number of these combined departments the subject of pharmacology is so distinctly under the control of separate instructors that it really exists as a separate department and, therefore, should perhaps not properly be classified in the same sense with these combined chairs.

It seems to me that one of the greatest difficulties in teaching pharmacology is the apparent necessity to teach such a long list of drugs for fear of criticism by either the student or the clinician. It is well known that the average clinical teacher has a number of pet remedies, and in order to anticipate that the pharmacologist has frequently been led into a discussion and demonstration of a great many drugs which have very little value. If the teaching of pharmacology is to maintain its interest it will have to be concentrated on a very limited number of drugs, those that are well known and whose pharmacologic action is demonstrable experimentally as well as in a clinical way.

With reference to the future teachers of pharmacology, it seems to me that something will have to be done to enlist greater interest in the subject, and the scheme of instruction such as has been promoted by the McGill University Faculty of Medicine will do more for this than anything else.

I would like to direct attention to the employment bureau which is being maintained by the Federation of Biological Sciences. This bureau is now under the direction of Professor C. W. Edmunds of the University of Michigan, and was founded some years ago by Dr. Meltzer, and is

intended as a link between the schools and the men available for teaching positions.

I feel that pharmacology has a distinct place in the medical curriculum, and at this time I beg to suggest a different division in the completion of the fundamental sciences so as to complete the subjects of physiology, anatomy and biochemistry in the second year. (There are largely concerned with the normal, and also adapt themselves very well to the proposed early work in clinical medicine) and that pharmacology, bacteriology, which includes immunology and parasitology, pathology, general and special, be completed in the third year, because the last three subjects refer particularly to the abnormal and have to do with the sick individual; then in the fourth year there be completed the four usual subjects of surgery, medicine, obstetrics and gynecology, and public health. By trying to concentrate and finish the six fundamental sciences by the end of the second year is too much of a hardship for the student. Furthermore, it makes it difficult to arrange the different final examinations. To expect a candidate at the end of two years of study to sit for a final examination in the six fundamental subjects is asking too much, both on the part of state boards or any central examining agency like the National Board, and I believe with such a change in the completion of the subjects named the final examinations can be more equably arranged, and will also promote a better coordinated scheme of instruction.

THE POOR BOY IN MEDICINE

WALTER L. NILES
Dean Cornell University Medical School

My remarks will refer to the boy, or girl, who is poor in financial assets; one with little or no capital to pay tuition and other expenses during the course in medicine.

The problem which is presented by the poor boy who applies for admission to the medical school is one which frequently confronts the admitting officer or committee, and it is often difficult to arrive at a solution which gives due regard to the interests of the applicant, the medical profession and the medical school. The correct answer doubtless varies with individual applicants, but continued observation and experience have led me to conclude, though reluctantly, that they should generally be advised against entering on the study of medicine. There are undoubtedly many exceptions to such a rule, but I am convinced that we have in the past been unwisely lenient and have thereby done serious injury to the interests which we have aimed to promote.

The poor boy has usually been obliged to work his way through college and for that reason frequently, though not by any means always, represents a sturdy type of individual with a certain strength of fibre, both physical and mental, who should be welcomed into any liberal profession. In addition, he has sometimes been able to engage in athletics or other desirable student activities where a fixed purpose and qualities of leadership are essential for success. However, the facts are that he has seldom been an outstanding man in his class. His health may have been impaired by overwork and poor hygienic surroundings; his scholastic attainments have certainly been diminished and, worst of all, he has developed a rigidity of his mental processes that precludes imagination, so essential for all creative effort.

Having worked his way through college, he believes that he can do equally well while studying medicine. He does not know that in the medical curriculum there are very few unoccupied

hours during the day time and that we require so much of our students that their entire energy and time is necessary for them to get what they should from the instruction offered. Of course, it is true that many do pass the examinations and graduate, some of them with distinction. For such I have the highest admiration. Yet I have not seen one who, in my opinion, would not have been a far better scientist and doctor had he not been handicapped by poverty. The truth is that comparatively few poor boys attain even average grades and, which is a better index of their usefulness, very few are listed as desirable for hospital internships.

It is, perhaps, a still more serious matter to consider the health of these boys. Many of them accomplish extraordinary things, working evenings in drug stores, theatres and shops, or tending furnaces early and late. I have also seen many of them develop tuberculosis, gastro-intestinal disorders, anemia and psychoneuroses—a group of conditions seldom met in the well-to-do. Rugged health is essential to the successful pursuit of medicine, either in the laboratories or in practice, and one who loses his health in securing a degree has gained but little. It often happens that illness comes upon these boys after two or three years of medical study, in which event they have lost everything.

The interest which is, perhaps, the most important for us to consider in this connection is that of the medical school. When we recall that every student costs the school or university from five hundred to one thousand dollars annually in excess of the tuition fee, it becomes apparent that we cannot afford to accept any whose preliminary training has not been of the best or who are unable to devote all of their time and energy to take advantage of the opportunities which are presented to them. The large investment made by the school can be justified only by a maximum return in achievement. Mediocrity, though forced, is not enough. This view is more evident now that most schools have applications far in excess of their facilities and, therefore, select those applicants whom they believe best qualified to take advantage of the opportunities offered.

It is unfortunate that culture and refinement seldom go hand in hand with poverty. Through heredity the poor boy is apt to

be handicapped in his mental qualities, and by his environment his latent possibilities have been suppressed or repressed so that he often arrives at manhood lacking a background of good breeding. His vision has been circumscribed, his ideals have been undeveloped and his aims are too often commercial. As I see it today, the great needs of the medical profession are honesty of purpose, right thinking and sound leadership; these qualities even more than brilliant minds. Such qualities are seldom found among the offspring of foreign-born parents who have only since their entry into this country acquired sufficient independence to think freely and cultivate ideals. In the larger cities, at least, we are having very large numbers of such applicants in whom it is clearly evident that their early environment and opportunities have operated to stifle the growth of ideals, and we must have men with high ideals of service in the profession of medicine.

I fear that my remarks may be misunderstood and that the impression may be gained that I welcome only the rich into the ranks of medicine. That is not so at all. It is almost as much of a handicap to the aspirant in medicine to possess wealth as it is to have nothing. Distinction cannot possibly be gained in our profession without long, hard work, and most of us require the goad of necessity to make us put forth our best efforts. There is one type of poor boy who should always be welcomed into our medical schools. He comes from homes of refinement, permeated with upright thinking and high ideals such as those of educators, clergymen and many physicians, or those families which have recently or temporarily become financially embarrassed, and we should make every effort to take care of them.

It is obviously of vital importance to the future welfare of our profession that we do not exclude young people who are in every respect, except financially, desirable, and means should be found to take care of them. The best way would be by scholarships which would provide not only tuition but at least a large part of one's necessary expenses during the medical course. Unfortunately, acquisition of the necessary funds does not appear probably in the present state of educational needs. Funds from which loans, payable after a term of years may be made, are

highly desirable and the benefits which they carry are gladly accepted by most students.

I think it is generally best for the poor boys to avoid the necessity of very much outside work during the college year, and I think it is always a mistake for him to interrupt his course once started. It seems to me better for him to work for a year or two before commencing the course, or, when possible, to borrow funds which he will subsequently repay. There is, however, a serious objection to mortgaging his future so that he feels compelled to begin remunerative work immediately on completing his hospital internship, for it means that then, instead of earlier in his development, he must interrupt his scientific career from the necessity for making money. How often do men well qualified up to that point reply, when we urge them to continue in scientific medicine, that they must begin to make some money. It is very discouraging to the teachers and their efforts have, to a certain extent, been wasted.

I, therefore, submit my conclusion that when poor boys, or girls, apply for admission to our medical schools, the executive officers should carefully consider the applicant's circumstances, particularly with respect to the conditions which have resulted in their poverty, and then decide whether they are justified in making a large investment of money, time and skill in that particular applicant.

DISCUSSION

DR. THEODORE HOUGH, University of Virginia: Like other administrative officers, I have had considerable experience with the "poor boy in medicine." I agree with Dr. Niles that, in general, it is undesirable for men to undertake the study of medicine under a serious financial handicap. The results are generally not as good as one would desire and not infrequently they end in failure. My usual advice in such cases is not to enter upon the study of medicine until the student has the money to see him through at least the first year of the course. We can then try him out and be in a position to use wisely the very limited funds at our disposal for financial assistance.

The fact that the results in the case of the "poor boy" are often not as good as we should like is not inconsistent with the graduation of safe practitioners of medicine. Where a medical school has an excess of desirable applicants over its maximum capacity, doubtless it is not justified in admitting the "poor boy" on a one to three chance that he will fail or have to withdraw for lack of funds. Every school should

administer entrance requirements so as to secure the best possible output from the available material. When, however, there are vacant places—as there are in many good schools—I should hesitate to assume the responsibility of discouraging the "poor boy" from trying what he can do with the medical course. He would in that case keep no one out and my experience is that the percentage of these students who succeed in making at least safe practitioners fully justifies their admission.

In my own section there can be no question that the expense involved deters from the study of medicine a large number of students who are born of good American stock and whose background of home and community life constitutes one of the most valuable assets of the medical profession. These are not always "poor boys"; they are students who do not feel justified in placing upon their family an added financial burden; often the trouble is the necessity of educating younger children in the family. I confess to a decided feeling of dissatisfaction when each year I see the places of these students, whom my school is primarily intended to serve, taken by students of foreign parentage from the large centers of population—men who have failed to secure admission to the schools of their own territory because of limitations of numbers. By and large, it is the less desirable part of this foreign population which seeks admission to our southern schools; they are rejected applicants from the large city schools and constitute most of the "medical school shoppers" who spoil so much of the time of admission officers.

It is this situation which leads me to express the hope that scholarship and loan funds in medical schools be established on a far more liberal scale than at present. I see no other means of bringing into medicine the men who are now kept out because, while willing to make any necessary personal sacrifice, they are unwilling to place upon the credit assets of their parents the burden of financing even in part the cost of their medical education.

For this purpose the loan fund is the ideal solution. I would make these loans only after the student has successfully completed his first year in medicine and I would make them on liberal terms as to interest and repayment, possibly with no other security than the character that the student has established in the school. Our experience with such revolving funds at the University of Virginia gives us confidence that this is a safe financial proposition and I can conceive of no wiser form of public or private philanthropy. We want, above all things, to bring into medicine the most desirable personnel and every means to this end is worth all it involves in monetary outlay.

Dr. Irving S. Cutter, University of Nebraska: I might say that there are a number of schools that have loan funds. Nebraska is one. We had a bequest a few years ago which permitted us to take care of ten students a year on the basis that the student, to be eligible, must have completed his first year in good standing. The amount loaned throughout the three years is to be repaid without interest at such time

as he would become of earning capacity. That being the content and legal phraseology of the devise, notes are taken without date. So far the administration of the fund has been very successful and I am sure has saved ten students a year that "raw edge" of the expense of the academic year. In other words, it is helping to do just the thing which Dr. Niles so strongly emphasized, namely, permitting the student to complete his medical course without that amount of outside work or worry as would otherwise injure his health; affording, too, a sense of financial security.

DR. FREDERICK T. VAN BEUREN, JR., Columbia University: I don't know that I agree altogether with Dr. Niles. When I was a student I looked at the matter from an entirely different viewpoint. Looking at it from the point of view of the Dean's office, it seems to me that some of our very best students are those who have to earn their way at least in part. I was trying to recall, as I sat there, how many students we have that are earning a part of their way through college, and at a guess I should say 40 per cent. We distribute about seventy scholarships, not all covering the whole tuition, but a third covering the whole tuition and the rest about half of the tuition. We find that those scholarships, together with our loan fund, such as the one at the University of Nebraska I imagine, help the majority of those men to get through without a great deal of outside work.

In the last three years, which is my short experience in the administrative end of the college, I can only recall six men who have either been injured in health or in scholarship by their outside work. I have a feeling that as a general rule the more one pays for a thing the greater appreciation one has of it, and these men that are working their way through a medical school certainly pay a good deal more for their education than the men do who are supported by indulgent parents.

There have been three or four instances where it seemed to us the men's health was actually injured by the overwork, and perhaps as many more where we felt that their scholarship was injured by it, but judging by the number who have at first held scholarships and then had to give them up afterward because of falling below a certain scholastic grade, I should say that the percentage was very, very small indeed. I can only recall four instances now in the last three years of men who had been awarded scholarships because of having to work their way through who fell below an average of B, below which no scholarships are given, during their course later on.

I cannot help feeling that some of the men that we held through a medical course, either by scholarships or by loans from the loan fund, or by both, are among the very best men that we graduate, and I think that Dr. Niles did not emphasize what I am sure he meant, that it is not those who are financially poor that we don't want to take in, but those who are poor in spirit and poor in ideals and poor in cultural background and inherited good tendencies.

DR. E. P. LYON, University of Minnesota: I want to speak in the strongest terms against any discouragement of the poor boy. The thing in America that I am most proud of is that here the poor fellow has a chance somewhat in proportion to his ability. I was abroad again last summer, and I was again impressed with the fact that there he does not have a chance. That is the outstanding difference between Europe and America. It is not caused by any difference in the form of government, but by a difference in the ideals of the people.

I was delighted in reading the life of Lloyd George the other day. As you know, he had his struggles. I came across this expression: "Only the financially independent can afford to be disinterested." That is so. Therefore I am glad to see physicians come from the class of well-to-do. For doctors should be disinterested in money—or rather, money should not be their chief interest. But it is also often true that the financially independent are not only disinterested; they are not interested in anything. A good many lazy loafers around medical schools are financially independent.

I was reading also the life of Helmholtz, whom I consider the greatest mind that medicine has ever had. I find that he was poorer than I was, and that is going some. He was so poor that he could not become a physicist as he wanted; he could not go through the university. His father advised him to go to the military medical college where he got free tuition and a stipend for board. In his last year in this college he was sick with typhus and they took care of him for nothing in the hospital, but his stipend went on. He came out of the hospital, and with the savings of his stipend he purchased a crude microscope and with it discovered that the nerve fiber is a branch of the nerve cell. That is an interesting tale of what the poor fellow can do who has the brain and "guts" to do it.

I myself drove a milk wagon in Chicago for a year and a half after I finished my high school course to get money to start to college. I never had a term in college or university free from some form of outside work. My father labored with his hands. My widowed mother kept boarders to help give her children an education. My parents lacked culture, but they were the salt of the earth.

In this room there is sitting a man who is now in a prominent position in medical education who twenty years ago was cleaning Mrs. Lyon's rugs to help himself through the University of Chicago. Carlson, perhaps our leading American physiologist, came to America in the steerage.

If the poor boy has the brains and the stuff in him he will make up some way, at least in some part, for those lackings which he may have in the background of family cultural opportunities, and so on. I will encourage him every time. Put him on his mettle and let him do what he can.

I know that Dr. Niles is not taking any extreme view on this question and that he is as sympathetic to the poor man as I am. I know he has

to deal with a peculiar class of people, and I do not want this in any way interpreted as opposing certain aspects of his paper. But I do feel that you ought not to go away with the idea that the poor fellow should be discouraged, but rather that he should be encouraged. What is so precious as a young man's aspirations? Who shall say where genius resides? Who shall attempt to pick the future guides and lighthouses of humanity?

As to the specific point of loan funds, we have considerable of such funds at Minnesota, and I believe they do a great deal of good; but nevertheless if there wasn't a cent of them I should still urge the poor boy to go ahead. Point out the difficulties, if you will, but put no stone in his way. Why are these big endowments made of which Dr. Niles speaks? Why are we spending a thousand dollars, we will say, of endowment income or of state funds for the education of a medical student? Surely it is not for the rich fellow. It is for the poor man that those arrangements are really made; and that he should be discouraged from making use of the opportunities which philanthropy or the public through its legislatures is giving him seems to me to be perverting the very purpose for which the funds are given. The very existence of the fact that medical education costs a lot should be a reason for urging poor young men to take advantage of those opportunities.

Dr. W. H. MacCraken, Detroit College of Medicine and Surgery: I think I would be willing to enter a poverty contest with Dr. Lyon. Probably a number of us could do the same thing. I remember the first teaching job I had I got $15 a month by way of compensation, and I pretty nearly had to live on it.

When I see the poor boys drive up in front of our medical school in their Lincolns while I sneak around in the back yard with my Chevrolet, I cannot help asking myself questions.

I was very much interested in Dr. Niles' talk, and I think he is entirely right that the poor boy of sorts should be discouraged from undertaking the tremendous task of getting through medical school as it is today. But as Dr. Lyon said, there is another sort of poor boy.

Not all of use have endowment for scholarship purposes, but there never was a school that did not need a large number of hewers of wood and drawers of water, and I find that even in our small plant in Detroit we can take care of about ten or twelve young men whom we select pretty carefully, and we can give them just plain jobs. We do not wait until they have been in school for a year to find out whether they are eligible for these jobs or not. If at the end of the year they have not made good, the opportunity for a job is at an end. These fellows wash bottles, they patch up defective apparatus, they do a thousand and one things around the medical school, and they distinctly earn their keep. This arrangement seems to help them very much and they take hold well and like the atmosphere with which they are surrounded; they think they "belong." It works out very well.

It is not quite true that it costs an institution approximately $500 more for each man that it registers than the income derived from that student. In other words, if a school has a registration of 200 men, it can take on 210 without appreciably increasing the expense, and I think all of us are in a position to provide manual work for some of these poor boys in the medical school, arranging it so they can do a great part of it after 4 or 5 o'clock in the afternoon, and we can help them materially in that way.

DR. WALTER L. NILES, Cornell University: Of course, it is obvious that there are poor boys and poor boys, and every one presents a single individual problem that has to be decided upon its merits. My feeling is, however, that in many instances the poor boy has been rather forced upon us by a great variety of semireligious and charitable organizations who have thrown him into our hands with the responsibility of caring for him and carrying him on. I think we should not accept that responsibility of caring for him and carrying him on. I think we should not accept that responsibility as lightly as we have often done in the past.

Many times the poor boy unfortunately lacks the background and the early training which makes him a desirable entrant into medicine. Such an applicant should be excluded from medicine, not because he is a poor boy, but because of his surroundings and his lack of foundation on which to build.

I do not feel that we as administrative officers should more closely scan the poor boys and perhaps make less of an extreme effort to take care of them than we have done in the past, looking rather to those men and women who have sufficient, though perhaps not great, facilities to take full advantage of the opportunities that we have to offer. I am quite certain that a great many who have arrived at distinction, although they were poor in their youth, would have been much better men if they had had better opportunities.

A PROVISION FOR INCREASE IN MEDICAL SCHOOL ENROLLMENT WITHOUT INCREASE IN PHYSICAL EQUIPMENT

BURTON D. MYERS
Assistant Dean Indiana University School of Medicine

In 1904 there were 160 medical schools in the United States and 28,142 medical students. Fifteen years later (1919) there were 85 medical schools and 13,052 students of medicine. In 1904 there was an average of 176 medical students per school. In 1919 there was an average of 154 medical students per school.

While the total number of medical students had been cut in half, the teaching load per school had been cut only 12.5 per cent.

The year of 1919 marked the low point in medical enrollment. In the four years following there has been an increase in medical student enrollment to a total of 17,432, an increase of 33 1/3 per cent. The average enrollment has increased in one student generation from 154 to 218 per school, an average of 24 per cent larger than in 1904 and 41 per cent over 1919.

While the total number of medical students in the United States is 38 per cent less than in 1904, the population of the United States has increased 40 per cent.

In 1904 there were 37 medical students per 100,000 population. In 1923 there were 16 medical students per 100,000 population. That is, we have today only 43 per cent as many medical students per 100,000 as we had in 1904.

These facts explain why it is that we are besieged by growing numbers of applicants for admission to our schools of medicine in spite of increasing entrance requirements and growing fees.

Schools have endeavored to stem this rising tide of medical students:

1. By definitely limiting the number admitted.
2. By a quantitative increase in entrance requirements.
3. By a qualitative increase in entrance requirements, as a result of which medical schools today refuse as many men as they accept.

4. By increasing fees in general, while
5. State universities have also increased fees, particularly for students from other states, in order that their facilities might be conserved to a reasonable degree for the sons of those who pay the taxes for their support. This increase for the non-resident varies from $50 to $300 per student per year.
6. A still further method of escaping the deluge of students is a severe elimination in both premedical and medical courses. Our 80 sophomore medical students are the surviving 40 per cent of 200 university freshmen who three years before enrolled with a written statement of their intention to study medicine. An average of about 13 per cent of all freshmen medical students, 7 per cent of sophomore medical students, and 0.1 per cent of junior medical students have been weeded out by the medical schools of the United States in the past ten years.

In the past twenty years our population has increased 30,000,000, an average of a million and a half per year. At present it is increasing approximately 2,000,000 per year. It is probable, therefore, that we may expect still further increases in the demands for admission to our schools of medicine, though we continue to point out the fact that the number of doctors per 100,000 population in America is much greater than in Europe, or that improved roads have greatly increased the radius of activity of the individual doctor.

Meantime, the cost of medical education is mounting. Millions are expended in hospital construction. Where a score of years ago many medical schools were being run at a profit, sums running into the hundreds of thousands of dollars per school per years are spent in their maintenance.

In the face of the growing demand for admission to medical schools and the growing cost of medical education, it becomes a matter of major importance to consider if there may be some means of accommodating an increased number of students without sacrificing the quality of our work and without increasing physical equipment.

If we may assume that at the present moment there is in each of our medical schools a teaching staff adjusted properly

to the teaching load, then an increase in teaching load of, say, 25 per cent, will require a staff increase in order that efficiency may be maintained and investigation time conserved. The increase in staff must come and will be essentially the same, whether the increased enrollment is accomplished by extension of building and equipment, or by an adjustment of schedule providing for a fuller utilization of existing building and equipment.

Many laboratories stand idle half the time or more than half. The laboratory in gross anatomy is commonly used only half of the day. In the laboratory of that splendid anatomical institution in Munich, provision is made for storage of dissection material in moist chambers, easily accessible, so the table space may be used by successive groups of students just as in a chemistry laboratory. Such provision at once doubles the number of students that can be accommodated with existing physical equipment.

Laboratories in histology, physiology, etc., are commonly used for major courses only one semester. They could be used each semester, as is the case in departments of biology. This would require increase in staff, but no greater than would be required to accommodate the same increase in enrollment at one time in double the laboratory space.

The same end, accommodating an increasing number of students without increasing physical equipment, could be accomplished by condensing courses, having the same students in anatomy work forenoon and afternoon in the same laboratory completing dissection in one semester or one quarter.

While this is a possibility, I am persuaded that most of us have come to the conclusion that the time element is important; that the accomplishment of a group of students in 300 hours working forenoon and afternoon is not so great as working half of each day for twice the number of days.

There is, however, the summer quarter when buildings and equipment lie relatively idle. The utilization of this quarter would make enrollment of two sections possible, one, say, in September, completing in June; another January 1, completing nine months later in September.

The adoption of this plan involves the adoption of the four-quarter system, but it is probably the best method of accommodating an increased enrollment without increasing physical equipment. To maintain efficiency and conserve investigation time, this arrangement involves an increase in staff with any three quarters constituting the teaching year.

Still another method, very like the above, consists in splitting the fall semester into two nine weeks' teaching units. One group of students begins their year in September and ends in June; the other students begin their year at midsemester, about November 10, and complete at the end of a nine weeks' summer session, about August 10.

At Indiana University we have been experimenting with this latter plan. It has the advantage of not conflicting with state board rules in that each school year begins in one and is completed in the next calendar year. This is a relatively unimportant consideration, however, for the conditions that made this rule once important have long since disappeared. The plan was first made use of to accommodate a group of Federal Board men who had slight deficiencies (4 to 8 hours) in premedical work, but who had to complete their medical course in four years. The four to eight hours of premedical deficiency were completed in the first nine weeks. The second nine weeks were devoted to concentrated work in anatomy, completing the semester's work in this subject. The nine weeks in summer were devoted to completion of the work omitted in the fall semester. The plan has possibilities worth considering.

All things considered, the quarter system, with a September-June and January-September session, is probably the best adjustment.

Any one of these plans involves schedule adjustments which different schools would work out in different ways, so a discussion of them here would probably not be profitable. It is obvious that the fullest utilization of teaching facilities may fairly be expected of us, but this does not permanently solve, but only postpones the time when additions to physical equipment must be made, either by enlargement of existing plants or by the building of additional ones.

	Year		
	1904	1919	1923
Medical Schools in United States	160	85	80
Medical Students in United States	28,142	13,052	17,432
Average Number Students Per School	176	154	218
Population of United States	75,000,000		105,000,000
Medical Students per 100,000 Population	37		16
Percentage of Students in Proportion to Population Compared with 1904			43%
Percentage Increase in Teaching Load Over 1904			24%
Percentage Increase in Teaching Load Over 1919			41%
Approximate Increase in Population Per Year			2,000,000

DISCUSSION

DR. HUGH CABOT, University of Michigan: I am interested in Dr. Myers' paper because it seems to me to point to a very definite method of helping out the present situation. I do not, myself, feel very much concerned about the possibility of turning out, under present conditions, an insufficient number of medical graduates. I think in the past we have been unquestionably oversupplying the demand and that at the present time we are probably fully supplying the demand and perhaps even slightly oversupplying it. On the other hand, with the steady increase in population we are coming forthwith to the time when on the present output we shall not be meeting the demand.

I have been particularly struck in all education, and not less, I believe, in medical education, by the fact that we have not been utilizing our equipment to the fullest; that there are long periods when both laboratory and lecture rooms stand idle, and yet it is often true that the getting of more space is a most serious part of the problem.

One thing I fear, and I wonder how Dr. Myers is going to arrange for it, is the tendency which such a plan as he sets forth will have to actually increase the amount of demand made on the teaching staff. I have a feeling that, particularly in the preclinical years, we are of the present time making a full demand, and perhaps an excessive demand, on the time of men for pure teaching and thereby considerably curtailing their usefulness in investigation. The adoption of the four quarter system will, unintentionally, perhaps, but more or less inevitably, put more strain on them in the way of teaching requirements and cut down still further their possibility of productive work.

Again, this plan will have difficulty in the way of obtaining competent instructors. I suppose every school today is faced with the difficulty of obtaining competent teachers. The supply is certainly not up to the demand. Unless some new source of supply appears, which is not now to me evident, it will not be possible very importantly to increase staffs taken broadcast over the country. If that be true, we are faced with the choice of either not really increasing the amount of teaching done or putting on a heavier load.

I hesitate a good deal actually to make the step into the four quarter system, because I am afraid of the difficulties of obtaining teachers, and I am very unwilling to increase the load. That appears to me to be the difficulty with the proposition put forward.

DR. WILLIAM PEPPER, University of Pennsylvania: I wish very much that I had a solution of this problem, because it is a troublesome one to any dean, particularly if you are trying to look into the future. I do not see so much of a problem in the increase in the physical plant, that is speaking in terms of laboratories. As Dr. Myers has pointed out, a laboratory can be used morning and afternoon; if necessary, it can be used every day in the week instead of two or three times a week. The problem is more one of personnel. I suppose when we do have to admit more students than we do at present with the increase in population of the country, the long-sought-for supply of instructors will come along too. It is an economic problem of supply and demand, but there is nothing very encouraging in the outlook at present. It is hard enough to get the instructors needed to teach our present size classes. I would hesitate very much favoring any plan of increasing the number of students unless an adequate number of instructors fully qualified could be found.

When we speak, however, about physical equipment in the way of hospitals, then it is a very different proposition. You cannot use a patient in the hospital morning and afternoon and you cannot use him every day in the week. You must let him have a little rest. It is all very well to say, "Make use of other hospitals in the city or in the neighborhood. Make use of teachers and those wards that at present are not connected with your school. Send your students by trolley or via a big automobile bus, and take your class two or three or four or five miles away and let them be taught there." We probably, I suppose, will come to something of that sort, but there will be a lot of lost motion and there will be less coordination than we have at present. If you have to send your students off to some other hospital in the city that is not under your direct control, you are not going to be able to bring about much cooperation or coordination. So that it is, as I see it, not a problem of whether we shall build larger laboratories or more laboratory buildings but a problem of providing teachers and providing clinical material in sufficient quantity right at hand and under absolute control.

There is nothing, I think, that would help us more than to know how many medical students there will be in this country twenty-five years from now or fifty years from now. If we could only know that and plan accordingly, it would help us out of a lot of future trouble. It is one of those things that we are all thinking about and puzzling over, and I am afraid there is no definite solution at present.

DR. E. P. LYON, University of Minnesota: We have the quarter system at Minnesota. There is a discussion now going on as to whether we shall change back to the semester plan, but I do not think we will. I think

the sentiment in the faculty is growing that it does not matter much which system we have as far as essentials of University organization are concerned, and that, if you have one system, you had better stick to it because you will have a terrible time changing.

The point has not been emphasized much at this meeting in regard to the hospital side of medical teaching. It has always seemed to me that while we may regret to see great laboratories remain largely unused through a long vacation, it is the next thing to criminal to see hospitals and dispensaries going on during this period unused for teaching, because there the expense keeps up just the same whether they are used or not. We use the hospital facilities which we have as much in the summer as any other quarter, and I will review briefly how we do it.

At the end of the sophomore year the class divides into two sections or parts which we limit to fifty members each. Division "A" begins the junior work at once with the summer quarter. They go straight forward and are ready for their internships or for the first degree in medicine which we give, the Bachelor of Medicine degree, a year from the following December. The second division, "B," enters in the fall, three months after the first, and goes forward for two quarters and then takes a vacation of a quarter and then goes forward for four quarters, graduating at the regular time. Thus, we have complete classes graduating in December and in June of fifty men each, approximately.

Our clinical facilities, such as they are, are used throughout the year and there is not the loss in that regard, at least, which would otherwise be entailed. Putting it another way, I think that this plan increases our clinical facilities one-third without costing us a cent.

On the laboratory side we still run under the summer school plan, and a student cannot gain any time by taking the summer quarter. Occasionally a student does, but not many do. We have no arrangement as yet for taking classes in the freshman year at any time except the fall quarter.

DR. ROSS V. PATTERSON, Jefferson Medical College: If the buildings of some of the medical schools are to be used the year 'round, they would have to be reconstructed for use during the summer months. The Philadelphia climate is entirely unsuitable for any systematic work during the summer months, and certainly so unless our buildings were reconstructed, and even then I doubt if it would be satisfactory. I quite agree with what has already been said with regard to the chief difficulty of continuous instruction. It is not a matter of facilities nearly so much as it is a matter of getting a teaching corps of sufficient size to carry on the work throughout the year.

DR. BURTON D. MYERS, Indiana University: The matter of getting the teaching corps, which has been mentioned a number of times, must be faced sooner or later whenever increased enrollments are permitted. Though I cannot say how the increase in teaching staff will be provided,

the adjusted schedule presents no difficulties not encountered in the increased physical equipment program.

I realize it is rather easier to get physical equipment rather than departmental budgets, but that should be no excuse for following the line of least resistance. No matter how large a budget medical schools have, most of them need larger budgets. If it is possible to save on building program by schedule adjustment, capitalization of half a million dollar building at 6 per cent gives $30,000 for needed departmental budget.

THE FIFTH YEAR REQUIREMENT: A RETROSPECT

L. S. SCHMITT
Acting Dean University of California Medical School

Engineering schools and schools of mechanics often require shop or field work before students are graduated. Normal schools require actual teaching experience. Corporations require practical training, in addition to theoretical instruction, of young men entering their organizations as executives or experts. Should not the medical student be required to pass a test of his ability and responsibility before receiving the stamp of approval of the medical school from which he expects to graduate? If the training of the teacher, the engineer, or the corporation expert is incomplete without practical training, is it not safe to conclude that the training of the physician is incomplete without the practical experience obtained in the so-called fifth or intern year? If those who teach our children and build our bridges must obtain their first experience in the practice of their professions under supervision, is it not just as desirable that those who are charged with the prevention and cure of disease obtain their preliminary experience in hospitals under supervision, and surrounded by the best conditions possible?

In recent years many arguments have been advanced for and against the advisability of requiring the fifth or intern year as an essential to the granting of the degree of Doctor of Medicine or as a prerequisite to the right to practice the healing art. This question cannot be considered as a settled one, but it would appear that, so far, the preponderance of evidence has led to the conclusion, in many minds, that hospital intern service or its equivalent is advisable for medical students.

As to whether this should be required by the state or the medical school does not enter into the scope of this paper.

If we concede that a fifth year is desirable, we must ask ourselves the question, "Is it practical?"

Due to the efforts of various agencies and through public demand, the last few years have brought about a marked change for the better in hospital conditions.

The number of hospitals in which medical students and young graduates can take internships with profit to themselves has increased. At present the demand for interns is greater than the supply. In approved hospitals the shortage amounts to 7.5 per cent. This leads to the conclusion that internships can be secured for all students who have finished four years of the medical curriculum. It is true that there are local difficulties, such as placing married students or a large number of women students. These difficulties may largely be overcome by permitting a year in a laboratory or as a special worker in a department of the medical school to be accepted as fulfilling the fifth year requirement.

The objection, that students not being licensed to practice, may not function as an intern should, has been met in California by an amendment to the medical practice act. This provides that a student regularly matriculated in any legally charted school, approved by the State Board of Medical Examiners, may treat, without compensation, the sick or afflicted as a part of this course of study.

At the University of California Medical School, the fifth year requirement has been in effect for six years. In the six years prior to the adoption of the fifth year requirement, 90 per cent of the students voluntarily accepted an internship. It is interesting to note that of the remaining 10 per cent, 7 per cent were in the lower third of their respective classes.

The type of internship which should be demanded in fulfillment of the fifth year requirement has received consideration. Reviewing our experience, the conclusion has been reached that it should not be merely a year added to the medical curriculum, in which formal, didactic courses should be offered, but rather that it should be in the nature of a practical test to determine the capacity of the student to practice the healing art. It may be said that the medical student is constantly under observation during the entire medical curriculum, but the fifth year is the final test of his ability to utilize the mental background which he has presumably acquired.

In a paper read before the Tenth Annual Conference on Medical Education in Chicago, February 24, 1914, President Lowell of Harvard University called attention to the danger to

the maintenance of high standards from excessive formalism. While this paper had under consideration primarily premedical education, the dangers pointed out might well be considered in a study of the most desirable type of internship.

If it were possible, an ideal internship would consist of a medical service first, followed by a surgical and obstetrical service and covering a period of not less than eighteen months. If an internship is required before graduation, an internship of over twelve months is manifestly impossible. The experience of the last few years at the University of California Medical School, with a rotating internship covering all services and with an internship in which longer periods of service in the various departments is demanded, tends to the opinion that the longer services are more desirable. In a teaching hospital the demands of the departments must be taken into consideration. Heads of departments object to constant changing of their intern personnel. We have found it advisable to limit the internships to not more than two subjects, namely, medicine and surgery, medicine to include pediatrics, etc., and surgery to include gynecology and obstetrics. At the University of California Hospital the interests of both the student and the service is conserved by dividing the internships between medicine and surgery, six months each; medicine and obstetrics and gynecology, six months each; surgery and pediatrics, six months each; and pathology and clinical laboratories, six months each.

During the last half of the fourth year of the medical curriculum the student applies for an internship upon blank forms prepared for that purpose. This form indicates the available internships and contains also an agreement to accept the internship assigned to the student and to remain throughout the required period. The medical board of the faculty is charged with the assignment of internships.

The student indicates on his blank form a first, second and third choice, and choice of internships is permitted in accordance with the relative standing of the student in his class.

A rule of the faculty provides that the intern year must be taken in an approved hospital and the board reserves the right to approve or disapprove any hospital which has been selected by a student. The various hospitals to which interns are assigned,

if not directly under the control of the medical school, must agree (*a*) that each student shall be under the supervision of a member of the staff of the hospital; (*b*) that the year's work shall be under conditions approved by the medical board of the faculty; (*c*) that the hospital shall at all times conform to the requirements of the Council on Medical Education and Hospitals of the American Medical Association, and (*d*) that reports be sent into the dean's office quarterly and at other times when requested.

These reports must be on forms supplied to the hospital for that purpose and must indicate the professional service in which the student is engaged, the period for which report is made, name of the member of the staff to whom the intern is directly responsible, and remarks concerning the nature of his professional services. In addition, the director or superintendent must report as to the loyalty, conduct, co-operation, executive ability and obedience of the student, noting demerits in detail. These reports become part of the student's record and are taken into consideration in determining the candidate's right to receive his degree.

There is no obligation on the part of the school to find internships for its students. At the present time there are a sufficient number of openings to provide for all members of the graduating class. In most instances, members of the faculty of the medical school are also members of the staffs of the hospitals in which our students may obtain internships.

At the same time that our faculty adopted the intern year, provision was made permitting the fifth year requirement to be fulfilled by a year in a laboratory or as a special worker in any major department of the medical school. It is provided that this year may be accomplished any time after the first half-year as well as after the fourth year, provided the student has creditably accomplished his required work in the subject in which he desires to fulfill his fifth year requirement. He must engage in work of advanced standing. This may also be taken in the Hooper Foundation for Medical Research.

Students must first obtain the consent of the head of the department concerned and must be especially qualified to carry out the work which they elect. Prior to beginning their work,

they must register in the dean's office as fulfilling the fifth year requirement, and before credit is given towards the medical degree for the work accomplished they must receive a passing grade from the department concerned.

Approximately 10 per cent of the students in this school have fulfilled their fifth year requirement in this manner. Many of them, after receiving their degree, have also elected to take internships in hospitals. A survey of the records of the students who have fulfilled their fifth year requirement in a laboratory or as a special worker has shown that they have stood high in their respective classes. Six of our graduates who have fulfilled their fifth year requirement in this manner have become assistants in the departments of anatomy, physiology, biochemistry, bacteriology and pathology.

In a number of the hospitals associated with the University of California Medical School, students who have fulfilled their fifth year requirement may continue on the resident staff as assistant residents for a term of one year. From these are selected the residents whose period of service may be for a year or longer.

If the fifth year requirement is worthy of a place in medical education, it must be considered solely from the educational viewpoint. In our school, students are not assigned to hospitals in which interns receive compensation other than board, lodging, uniforms and laundry. Competition between hospitals has led to the payment of interns by offering them salaries or bonuses. Hospitals paying interns for their services naturally expect some return in the way of routine service to the hospital. In our opinion, this service should be secondary, or the fifth year would soon lose its value as an educational factor.

In summing up our experience for the past six years, the following conclusions are reached: (*a*) from the educational viewpoint, the fifth year requirement as above outlined has been successful; (*b*) it should not be merely another year added to the curriculum, but should be in the nature of a practical test; (*c*) rotation of services is not essential for the development of well-prepared practitioners of medicine; (*d*) selected students should be permitted to fulfill the fifth year requirement in a

laboratory or as a special worker in a department of the medical school.

DISCUSSION

DR. ERNEST C. DICKSON, Stanford University: The requirements for the fifth year service of our students at Stanford differ from those which have been outlined by Dr. Schmitt in that we require a rotating service in which medicine, surgery and gynecology and obstetrics are included. The majority of our students are assigned to our teaching services at Lane Hospital and the San Francisco Hospital and are under our own direct supervision. A few are sent to other hospitals, however, and selection of these hospitals is made in much the same manner as has been described by Dr. Schmitt. The hospital must guarantee to give an acceptable rotating service, to supervise the student's work and to report to the Dean of the medical school concerning the character of the work done and the fitness of the student to practice medicine and surgery. In so far as our experience of about ten years has given us an opportunity of judging, we believe that the arrangement insures a better training for our students than was obtained under the former plan.

DR. WM. DARRACH, Columbia University: Columbia decided on a fifth year about six years ago. After changing the curriculum around to arrange for that, we found that we had accomplished one thing, which was to make a lot of trouble for ourselves in getting back to the old four-year schedule, because the fifth year was given up as impractical, luckily before it was started. Personally, I am in very grave doubt as to the wisdom of the fifth or intern year. Theoretically, I think all of us agree that every medical man who is going to practice should serve as an intern in a hospital. When men come to us for advice on the question and desire to take one year as an intern, we tell them that we think they are very foolish and that a year's internship should only be taken where it is absolutely necessary for the man to get to work to make money or else he wants to spend one year in order to take another chance at the hospital that he really wants.

I think most of us feel that one year is insufficient as an intern preparation, that a year and a half or two years, or somewhere in between, is a minimum, while the best men will go on as assistant residents and residents for a much longer period of time. If we feel that the minimum is more than a year, why tack on this fifth year as a requirement for a degree? Why not say what we actually think, a year and a half or two years, or whatever it is? Moreover, there is a great deal of hesitation in our school of the men assuming the responsibility for work over which they have not a complete, or relatively complete, control.

We have not enough internships at our disposal to satisfy the needs of our graduating classes; we have nowhere near enough. We have twenty-one appointments which are under the control of the school. That is not enough for a graduating class of one hundred. The remainder have to go out and get their appointments as best they can, many

of them in hospitals in New York on whose staffs are men associated with the school; a good many of the others have on their attending staffs men who are not connected with the school, and in either case we have very little control over or very little to say as to what shall be done with those interns while they are in the hospital. If that exists even for 10 per cent of the class, I do not think we should be responsible for that fifth or intern year.

Dr. Schmitt has spoken about it as a testing period, comparing it to the engineers and various others who are required to do practical work. I thought that all the schools nowadays in their fourth year had enough practical work to test out a man's ability in their clinical clerkships or other ways in which they might determine whether or not a man had the practical ability as well as the theoretical knowledge. I think some one quoted some figures on the averages for the first, the second and the third years. No figures were given for the fourth year. I wonder how many of the schools who have the fifth or intern year have failed any of the men after the completion of that fifth year. If it is to be a testing ground, let it be an actual one, not a mere formal paper thing. Those are some of the reasons why we have not adopted the fifth or intern year.

DR. W. H. MACCRAKEN, Detroit College of Medicine and Surgery: In Detroit we put the fifth year into effect last year and almost immediately we encountered this peculiar situation. Several good hospitals on which we had regularly depended for intern service closed their doors on our fifth year men because they were not graduates in medicine. They objected to cluttering up the intern staff with men who were still undergraduates, even though they had completed the prescribed four years of the medical curriculum. I should like to know whether any one else has encountered that difficulty.

DR. WILLIAM PEPPER, University of Pennsylvania: I would like to call attention to certain statistics. Jefferson Medical College graduated 147 men who went to sixty-seven different hospitals. The University of Pennsylvania graduated 123 who went to seventy hospitals. These two Philadelphia schools send their graduates to a greater variety of hospitals and to a greater number of hospitals than any other schools.

In Pennsylvania we have a state law which requires a fifth year. Pennsylvania was the first state to pass such a law. The graduate who intends to practice in Pennsylvania has to take an internship in an approved hospital, a rotating service. The Pennsylvania Board has been able to improve greatly the services offered in Pennsylvania hospitals through that law. Any hospital which gives a service not approved of, is taken off of the approval list, and a graduate who goes to such a hospital gets no credit in consequence.

I would also like to call your attention to the fact that of the 147 graduates of Jefferson, 147 are serving internships, and that of the 123 University of Pennsylvania graduates, 121 are serving internships, although neither school requires an intern service for the degree. My guess

would be that of the 270 graduates from Jefferson and Pennsylvania, about 60 or 65 per cent intend practicing in the state of Pennsylvania and are, therefore, necessitated by law to take an intern service, but that the other 35 or 40 per cent do not have to by law take an intern service and yet are doing it, so that practically every graduate is taking an intern service whether he has to or whether he does not have to.

I would urge that preferably this fifth year be made a state requirement, because I believe the state boards then can exert much more pressure on the hospitals to improve their services than the medical schools ever can. That, I think, has been the great benefit of the law. It has not made more of our graduates take intern service than before, because they practically all do so anyhow, law or no law.

We have not felt, although the state required the fifth year, or perhaps it would be better to call it the hospital year, that we would withhold the diploma until they had completed the year because we believe we can have very little control over the men while they were in the hospitals.

I feel that we in Philadelphia are opposed to the fifth year as a requirement for the degree, but I believe we all agree that it is a good thing for the state to require it. If I am mistaken, perhaps my fellow deans from Philadelphia will correct me.

DR. ROSS V. PATTERSON, Jefferson Medical College: Obviously the control of the intern service, or the regulation or observation of intern service, is limited on the part of the medical school. That is to say, it is possible to keep track of the graduates in a limited number of hospitals only. Those institutions that deal largely with the students who come in from nearby districts would find it easy, perhaps. Our student body comes from forty-seven different states and ten foreign countries. Many students are encouraged to return to their own states to get their intern service. We believe that that has several advantages. In the first place, they learn the diseases epidemic or prevalent in that particular district; they become oriented in the medical profession; they often make friends among the practitioners, the influential men of that district, which has certain advantages. In their early years of practice they have, at least, a hospital acquaintance if not a hospital connection. Other men are advised to select a hospital, according to their needs and according to the length of time which they can give to that work.

I maintain in my office a file of over 300 hospitals with information with regard to each one, and that information is freely available to any student. We have maintained for more than twenty years a committee on hospital appointments. Students are advised according to their best interests. They are encouraged to enter hospital service for as long as it is possible for them to serve. Many of them desire to go into the public service, and are advised to enter some hospital that will more particularly fit or equip them for that work. Obviously, it is apparent that it would be impossible to supervise or even familiarize one's self with the work of so many men so widely scattered, nor do I believe that it is

desirable to do so. It seems to me quite impossible to be responsible for work that cannot be controlled.

DR. WALTER L. BIERRING, National Board of Medical Examiners: The matter of the fifth year as an academic requirement has not proven popular for various reasons, and the most prominent one is perhaps that the academic control of the fifth year, as the intern enters hospitals distant from the medical school is lost, and, therefore, it would be rather difficult in many places in this country to properly supervise this fifth year.

Reference has been made to the relation of this question to state boards and to licensure examinations. I think the purpose of state boards has been to follow the suggestions of this Association that an additional year was necessary before a graduate should be licensed to practice medicine, and on that basis requirements in the form of amendments to the statutes or definite rules of state boards have set forth the qualifications of this fifth year.

I feel that we will have to admit that Pennsylvania has set a pace that we have all been inclined to follow. If the fifth year is to be regarded as a qualification for practice, the special or additional year in a laboratory, even though it is of clinical character, is hardly equivalent to a well organized intern service in an approved hospital. Unfortunately, one year is hardly sufficient time for a good rotating service, but if a hospital year is to be required it should be of this character.

When the National Board of Examiners was organized, its founders felt that they should formulate a qualifying test for the practice of medicine that would be expressive of the very best training in this country, and they followed the suggestions made by this organization and by the Federation of State Boards that this fifth year should be a hospital year, but they feel, on the other hand, that as the National Board examination is more a test of knowledge, the Board is therefore justified in accepting candidates to take their examination who have spent this fifth or additional year in an approved laboratory. Yet those same candidates are always advised that if admitted to the National Board examination in that way and obtain its certificate of diplomate, they must conform with the hospital year in those states where the same is a requirement for licensure.

Regarding this question from the viewpoint of the examiner, one is convinced that the additional year should be in the form of a hospital year and be a requirement for licensure but not necessarily a requirement for the medical degree.

DR. DAVID L. EDSALL, Harvard University: May I speak on one point more particularly in regard to the matter of the fifth year. I think I can emphasize what Dr. Pepper said by the figures in regard to our students. There is no requirement at all, of course, for the fifth year in Boston, and, as you will note, the students from Harvard and Tufts and Boston University practically all take a hospital experience. In all of the schools of high standing it is now practically so much the atmosphere that a man

must have this hospital training that there is very little difficulty in getting them to do it. They do it spontaneously.

The one point I want more particularly to speak about is this: I should personally be extremely grieved if this Association expressed itself as definitely favoring a rotating service. I do not ask other people to agree with me, but I do ask that people be allowed freedom in regard to this point. I had experience for twelve or fifteen years with rotating services in some of the most prominent hospitals in the country. For the past twelve years I have had experience with equally conspicuous hospitals and with students of a similar character of training in hospitals that are not rotating services. I am as strongly convinced as I am of anything in medicine that the latter produces the better man, the safer man for the public, and I would personally be very much in favor of giving out men to the public who had had a thorough training in any one large line. I would not say that I would recommend the man who had gone to a hospital where he did only ophthalmic work, for example, and then was going to do general practice of medicine, but I am perfectly clear in my mind that I would rather turn out to the public a man who had been through a good service in general medicine or general surgery or in pediatrics, for example, than to turn out a man who had been in an equally good hospital but who had been through relatively brief rotating services.

My opinion on that is based on the personal experience I have had with these men and the observation I have had of them after they got through their period of service.

I do not ask people to agree with me and I do not ask the gentlemen who have spoken in favor of rotating service to say they are wrong; I only say that I think we ought to be very flexible about these things, and I think sincerely we ought to discourage state boards from making such detailed regulations as to what a service should be. So long as the hospital is a hospital that provides a broad opportunity for a man, not in a limited special line but in a broad line, and is a hospital of high character with a high character of staff, that seems to me to be sufficient.

Dr. A. C. Abbott, University of Pennsylvania: I was delighted to hear what Dr. Bierring said with regard to the exceptions in favor of the man who intends ultimately to do only laboratory work. The number of such men is so small that I think it a pity to make an exception in their favor, and, moreover, as a laboratory man I believe every laboratory man is made a better laboratory man by his having a year in a good hospital.

I am inclined to think as Dr. Edsall does, too, that the matter of specifying the kind of service is not of very great importance. I think it is more the character of the service. I should be inclined to discourage a student going to a strictly special hospital and would prefer for him to go to a general medical or a general surgical hospital or a hospital in which both services existed and let him put in his full time in one or the other. After all, the real benefit of a hospital service is the responsi-

bility thrown on the student. Incidentally he acquires also a good deal of what we call the art of medicine, which he does not usually get in the school.

I am very glad to hear the expression of opinion from Dr. Bierring, representing as he does the National Board of Examiners, on the matter of discouraging the excusing of any one from his fifth year.

DR. N. P. COLWELL, American Medical Association: There are several reasons why the rotating service seems better than the nonrotating service. First, it puts a man in touch with all types of cases which without the internship he would have to get out in his general practice.

A number of institutions are now extending the internship to eighteen months in order that the rotation may not be so frequent. That is the trouble with some of the hospitals having the rotating service—they rotate the interns too frequently so that the period of service in each of the departments of the hospital is too short.

Another reason for the general rotating service is an answer to this criticism that we are turning out specialists. A young physician who takes his internship in one of the special departments of the hospital is apt to think he is fully competent to go out and practice as a specialist. Such internships indeed are said to be one of the factors which are rushing men into specialization faster than they should go and without the additional training which they should have in their chosen field.

We are right on the verge of a rapid development of postgraduate schools, and the opinion of those on our special Committee on Graduate Education is that no one should begin to prepare himself for the practice of any specialty unless he has completed a rotating service in a general hospital,—essential to round out his basic undergraduate training. It is believed, that, if properly given, the rotating service will prepare a man better for the general practice of medicine than would be a training in one department of the hospital.

The rotating service gives the man the basic training for a graduate course if he is going to specialize; or, if he is not going to specialize, it gives him a better all-round training for his general practice.

DR. DAVID L. EDSALL, Harvard University: May I say just one word in regard to what Dr. Colwell said. My comparison between the rotating and the straight service was intended to refer to the man who is going into the general practice of medicine, in the first place. In the second place, it was not made between hospitals that have very rapid rotation, but hospitals that have rotating service of twenty to thirty months; and, on the other hand, the hospitals have a straight service that lasts sixteen or twenty months. I believe the latter produce better men that I would rather recommend for the practice of medicine.

DR. STEWART ROBERTS, Emory University: Speaking for the intern subject in the southern states, approximately one-third of the hospitals and approximately one-third of the physicians in the United States are in the southern states. We find that the average intern who graduates

in the southern medical school is glad and anxious to take only a year's internship in a southern hospital and that he prefers that that year's internship in the south shall be a rotating service because he aims and hopes at the expiration of his first intern year to go East or North or West, as occasion and opportunity offer, in order to take a nonrotating service along the particular subject to which he feels inclined. So in the South, as a rule, we have found that the only service that will retain an intern is a rotating service and that not longer than a year.

DR. C. A. HAMANN, Western Reserve University: It would seem to me that unless the medical school has control of the hospital or hospitals to which interns go, it is unwise to make that as a requirement. The intern year is not always an unmixed blessing to the young medical man, and we all know of hospitals in which the ideals that the young man may have formed or has been taught in his medical school are ruthlessly shaken and the man is developing habits of carelessness, slothfulness, and other evils that certainly the medical school would not like to be responsible for.

DR. C. C. GUTHRIE, University of Pittsburgh: We have heard a good deal of talk today about the function of the medical school being the production of doctors. A school, to be entitled to self-respect and high standing, must not only train doctors; it must be self-perpetuating. At least that is the way we feel in Pittsburgh. Before the Pennsylvania law, which is most excellent in many ways, we had no trouble at all in the laboratory subjects of physiology, pharmacology and chemistry in training men to fill staff needs, but after the law went into effect, since the laboratory service is not recognized and the state does not recognize graduates until they have served a year in a hospital, we have experienced great difficulty in training men for staff positions in this group of subjects.

This does not agree, in a way, with what Dr. Abbott said, and I suppose he is right in saying that the laboratory man would be all the better for having had the fifth year in the general rotating service, but the fact stands out with us, nevertheless, that we do not get them as before.

DR. C. SUMNER JONES, University of Buffalo: Dr. Darrach stated that they had discontinued the requirement of the intern year but suggested that there be a state law requiring it. If the state requires the intern year, will the state guarantee an internship?

DR. DARRACH: I do not think, Dr. Jones, that I recommended that the state require it, although I do heartily approve of it.

DR. L. S. SCHMITT, University of California: There seems to be a consensus of opinion that the fifth year is all right provided some one else assumes responsibility. In answer to Dr. Darrach, I agree with him that one year is not sufficient, but would it not be better for the young man to obtain his first experience under supervision than to let him go out and obtain his experience in private practice?

As to the responsibility, I believe I mentioned in my paper that students are under observation during the entire period of their undergradu-

ate curriculum, but they do not have much responsibility. The test is different when they have to assume the responsibility in a hospital that an intern must assume.

You have asked as to certain figures regarding the efficiency of the test. I recall three men who have flunked, out of about 250 in the last six years.

It seems to me that the requirement by the state board is a very serious question. Suppose every state board required a different type of rotation, it would be impossible for hospitals to meet all the different requirements. In addition we would get away from the plan just mentioned by Dr. Edsall, namely, we do not want to educate specialists, but practitioners who have the ability to later become specialists if they desire.

We limit our internships to hospitals that are general in character. In our own hospitals the interns are assigned to major subjects and not to specialties. They gain their knowledge of the specialties only in relation to the major subjects concerned.

Lastly, as to the point that Dr. Guthrie brought up, we have obtained more junior assistants in the science departments since we have provided for the fifth year as a special worker than we were able to obtain before.

THE DETERMINATION OF THE CONTENT OF PROFESSIONAL AND PREPROFESSIONAL TRAINING

SAMUEL P. CAPEN
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It is impossible to isolate an educational process. With whatever grade or age of individuals it may deal, it is intimately connected with other educational processes, with social relationships, and in the broadest sense of the word with life itself. Therefore, there is hardly an important problem in education that does not affect other divisions of the educational establishment than the one in which it arises. Medical education is not self-contained, and the more highly it is developed the more varied and significant do its interrelations with the other parts of the educational system and with the other activities of the community become. These facts justify an outsider in accepting the hospitality of this Association and in bringing to you an outside point of view on certain matters in which other educational interests as well as your own are concerned.

Let me sketch for you the present situation in medical training as it looks from the standpoint of the general student of education. There is no other field in which standards are so uniformly high and so strictly enforced. With respect to both the definition of standards and their enforcement, there is no other field of professional training in which such rapid progress has been made. It is evident also that still higher standards are contemplated. No other profession has to so large an extent secured the incorporation in state laws of its ideals of professional training; and this movement also is advancing. Backsliding on the part of unscrupulous or ill-equipped training agencies is fast becoming practically impossible. Already there is poison around nearly every rathole, spread there by the officers of the state itself. Vigilance committees of the profession watch for the appearance of every new pest and invoke the assistance of the state in stamping it out.

But these high standards have not been secured at slight cost. Medical education has become enormously expensive. Universities must contemplate the outlay of about a thousand dollars a year per student with the possibility of still larger expenditures a few years hence. Some institutions already spend nearly double this sum. From the widest social point of view the expense is a serious matter. For the universities to which medical schools are attached it is infinitely more serious. In many instances a large proportion of the total amount spent on medical training represents a direct loss to other forms of higher education. University endowments and the appropriations made to public universities appear to the imaginations of donors and appropriators as lump sums. They represent so much for higher education. If higher education happens to include medical education, the purveyors of funds do not always perceive that disproportionately greater amounts must be provided. Therefore, engineering and liberal arts and laws have to some extent suffered that medicine might arrive at its present high estate.

But in spite of the meteoric advance of standards, in spite of prescriptive and defensive legislation, in spite of fabulous endowments and appropriations which cause all university men to thrill with pride at the same time that they quake with anxiety, the directors of medical education and the leaders of the profession are dissatisfied with the results. They are dissatisfied on two counts: (1) Students are not well enough prepared when they enter the medical school, and (2) the medical curriculum—and especially the scientific training that occupies the first part of it—does not register. If the country is going to spend a thousand dollars a year on the education of each medical student, or even half that sum, these are pretty serious dissatisfactions. Let us examine them separately.

A certain amount of confusion as to the purpose of the premedical requirements seems to have arisen during the past ten years. I believe that the original purpose of this requirement was to ensure a higher degree of general education and of mental maturity on the part of students entering the medical school. But whether or not that was the original purpose another purpose has evidently come to dominate the requirement. The Council on Medical Education and Hospitals of the American Medical Asso-

ciation has prescribed a premedical course which is directly preparatory to medical training. The subjects are subjects taught by the majority of arts colleges. But the combination of subjects required and the amounts required in effect relieve the medical schools of certain phases of the basic scientific education of physicians. The trend of recent discussion and recommendation also shows that medical schools are disposed to increase the preliminary requirements in the laboratory sciences in order that the technical work of the medical school may begin at a still higher level. Now, I think, the proposition is tenable that the premedical course as it exists today may be defined as professional education extended downward. At any rate it is obviously not general education designed primarily to broaden the interests and the understanding of the student.

I assume that the prescription of the content of the premedical course by the Council on Medical Education and Hospitals was in part based on the belief that students intending to be physicians would be more interested in subjects directly preparatory to their chosen profession. An initial professional motivation was expected. It has also been expected by many educators that the premedical course would increase this motivation. But apparently the motivation of premedical students is not of the galvanic order. The two-year premedical course, then, has not brought into the medical schools men either of that breadth of interest and mental maturity that some of the early advocates of preprofessional education hoped for, or, on the other hand, men sufficiently prepared to attack the technical subjects of the first year in a manner satisfactory to medical faculties.

No one can have followed the recent discussions of this Association and those of the congresses held annually under the auspices of the Council on Medical Education and Hospitals without becoming convinced that both the faculties of medical schools and the leading practitioners have grave doubts concerning the present status of the training carried on in the medical schools themselves. The criticisms for which these insiders are responsible may be summarized as follows: The medical course is too congested. The total number of hours required to be spent in class rooms, laboratories and clinical demonstrations is so great that students have no time for reflection, no time for inde-

pendent work, scarcely time enough to assimilate the body of prescribed material presented to them. Too many of these prescribed hours are devoted to specialties, like ophthalmology and otolaryngology. Indeed, more time is devoted to these subjects than is necessary if the student is to be instructed merely in their general aspects; but by no means enough time to prepare the student to follow any one of them as a specialty. Both the total time requirements and the distribution of time requirements among the several subjects are in many states written into the laws governing state licensure. Therefore, the framework of medical education is set. It can not be freely modified by medical educators. They can only alter the arrangement of the several subjects and the methods of presentation.

By reason of these requirements, which have become law, medical education, even more than arts college training, has come to be measured and judged almost wholly in terms of time spent. But for all the piling up of time requirements, seniors and young graduates exhibit a disconcerting ignorance of fundamental subjects. Particularly are they deficient in knowledge of the basic sciences, anatomy, physiology, pathology and biochemistry. These are the very subjects in the interests of which the whole plan of medical training has been recast in the last twenty years. These are the subjects which represent the first great cost of medical schools. For them the expensive laboratories are built and maintained. To give instruction in them medical schools have taken on the large staffs of full time teachers. Almost half of the whole medical course is given up to them.

Therefore, the conclusion forces itself upon the members of medical faculties that the whole plan of medical training is pedagogically unsound. It violates the laws of learning. It ignores the importance of interest that comes from genuine professional motivation. The normal human mind does not joyously proceed from theory to practice, from the abstract to the concrete. Its natural and instinctive action is the reverse of this. To give all the theory first and to withhold the practice that enlightens theory until the end, is a pedagogical sin. Painfully the teachers of engineering have been learning this lesson in the last ten years. The teachers of law, by reason of the vogue of the case method, have generally avoided falling into the same error. Medical educa-

tion, for all its high standards, its high costs and the high defensive walls that have been built up about it, is organically defective because it fails to take account of the factor of human variation and assumes to measure the acquirement of skill and knowledge solely in terms of time; and because it is based on the medieval pedagogical doctrine that theory comes ahead of practice.

The phraseology of the preceding remarks is probably more lurid than that of any of the gentlemen who have recently discussed these subjects at your meetings. The criticisms, however, are all criticisms that have come from members of your ranks. Since these are the views of a large number of medical educators it is safe to predict that another reform in medical education impends. If so, who is to reform it?

I am now about to utter the most blasphemous heresies. The first of these has reference to the past, the rest to the future. Many of your present troubles—and they are not your troubles alone, they are to some extent everybody's troubles—are due to the fact that the educators have let medical education and premedical education be taken away from them. I am not saying that if the educators had kept hold of medical education there would have been no mistakes. No more than any other class are they infallible. But if they had been in any effective way associated with the recent changes in medical education, just the mistakes that have been made would probably have been avoided. As it is now two things are apparent. Colleges can not change the premedical course without losing the approval of the Council on Medical Education and Hospitals, and hence forfeiting the privilege of putting students into medical schools. The medical schools can not make extensive alterations of the medical curriculum without being placed under the ban by state authorities. Have you ever heard the homely New England saying: "He tried to do too much and did it?" It has a certain bearing on the present dilemma of medical education. For the sake of college education and for the sake of medical education a concerted movement should be made to lift these hampering restrictions so as to allow respectable colleges and medical schools wide latitude for experimentation.

My next heresy is this. The reform of medical training is a joint problem of the colleges and of the medical school. They ought to work on it together. But both parties need more than anything else the careful study of all phases of the problem by specialists in education. Except for Dr. Flexner's epoch-making report there has been no comprehensive study of medical training by a specialist in education. The problems that perplex you are not peculiar to medicine alone. They are generic. They inhere in the task of professional training. The expert knowledge possessed by students of the science of education is an important instrument for their solution. If a program of reform could be framed as a result of such cooperative efforts, and if it were backed by the combined university interests, the necessary sanctions could be secured from the states and from the profession to put it into effect.

I should now like to suggest certain lines of procedure which might profitably be followed in the reform of medical training and certain principles that should guide the undertaking. In the first place we must speedily determine what premedical education is for. Again may I say that I think the colleges, through the largest representation, should be associated in that determination. If premedical education is to be defined as general education for the purpose of increasing the breadth of interest and the non-technical information of medical students, it should be treated in one way. If premedical education is to be recognized as specifically preparatory to the subjects of the medical curriculum, it should be treated in another way. This Association has taken the lead in bringing this important question up for public discussion. Your Committee on Education and Pedagogics, which is just about to report, has raised the issue clearly in the questionnaire which it has recently circulated among the medical schools. I have no fore-knowledge of the substance of the committee's report. From the questions which were asked, however, I assume that the members of the committee do not themselves entirely favor the retention of the present somewhat narrow and stereotyped premedical curriculum.

If it should finally be decided as the result of the work of your committee, concurred in later by the representatives of other professional and educational bodies, that the premedical course

should be general and not specific, then the determination of its content should be left to the colleges. If, on the other hand, it should be decided that the premedical course must be specific, then the content of the whole six years of training for medicine becomes a single unified pedagogical problem. In spite of the present character of the premedical course, the six years have not been so viewed. In the reorganization of the teaching materials essential for preparation for the practice of medicine the subjects should be distributed throughout the six year period solely with reference to the objective to be attained. That objective is the effective training of medical practitioners. The pedagogical problem is a hard one, but it is immensely fascinating and it is by no means insolvable.

Now, for my threatened statement of principles. These apply whether medical education is to be conducted in a four year course in medical schools alone, or in a six year course jointly by colleges and medical schools, or in a course of any other length or of indeterminate length. The first of these principles is that theory and practice must not be divorced. At whatever time the student's definite preparation for medicine begins, he should be introduced at once to simple but genuine practical medical problems. He should deal with the sick and with the prevention of disease. This should not be postponed until he has had eight hundred hours of anatomy, three hundred and sixty hours of physiology, to say nothing of several years of chemistry and biology, all designed to fit him to understand the nature and treatment of disease. The corollary to this proposition is that the theoretical branches, the so-called preclinical subjects—and again I include the basic sciences of the premedical curriculum—should be continued throughout the course, whether the length of the course be four years or six, or any other number of years. In other words, theory should be illuminated by practice. Advanced theory is difficult to understand and still more difficult to retain unless it is based on a certain practical experience which the student in the first two years under the present regime can not possibly have. If knowledge of the aspects of anatomy now covered in a course of eight hundred hours, for example, is judged to be essential for the medical practitioner, then every means should be taken to see that the knowledge is retained. Obviously,

from your own reports it is not now retained. Seniors and young graduates reveal quite generally a woeful ignorance of anatomy. The same may be said for other preclinical subjects. If these preclinical subjects were studied throughout the course, not for a greater number of hours, but in conjunction with clinical demonstrations and practice, it is probable that they would become much more thoroughly incorporated in the technical equipment with which the young practitioner starts his career.

The second principle I would suggest is that a specified number of hours spent on this subject or on that, or spent on the medical curriculum as a whole, is no guarantee of attainment. Time is, indeed, the least reliable measure of intellectual acquisition. With respect to the rate of their progress toward technical information and manual dexterity human beings are almost infinitely variable. The present medical requirements, set up by the profession and backed up by law, take absolutely no account of this variability. To be sure, the medical educators sin no more in this matter than do the other educators. But that does not absolve them. Instead of 3,600 hours, or any other number of hours, or four years, or five years, or any other time measure, the requirements for graduation and for admission to the licensing examination should be stated in terms of achievement. There should be, and there can be, tests covering the physiology a candidate should know, the surgery he should actually be able to perform, the chemical technique he should have acquired. Then for the welfare of the profession, and for the welfare of the people that the profession serves, it makes not the slightest difference whether the student acquired this skill and information in four years or in six years or in two years or in one. On the other hand, it makes a vast deal of difference whether or not medical schools clip the wings of the man who could gain the essential equipment in three years, and force him to take four. The present requirement is an instrument as monstrous and as absurd, and nearly as fatal to its victims, as the mythical bed of Procrustes.

The third principle that I offer is one on which all of your leaders have been harping for some years. I shall content myself, therefore, with a simple statement of it without elaboration. The medical course—and the premedical course, if that is to be

included in the scheme of professional training—should be pared down to the fundamentals. No science should be taught for its own sake, or because the professors of it desire to develop it in all its beauty and completeness. No minor specialty should appear, except to the extent that it is necessary for the general information of the practitioner. The proposition that is recognized in all medical discussions should be recognized also in the curriculum, the proposition, namely, that the school can not turn out a finished practitioner, but can only get a man ready to begin the practice of medicine.

My last suggestion will, I suspect, leave me in a minority of one, if I am not there already. It is this. I believe we need a comprehensive analysis of the duties and problems, first, of the young practitioner, and, second, of the experienced practitioner. The analysis should answer the questions: What must the doctor know in order to handle the cases that come under his observation day by day? And what must the doctor be able to do in order to treat these cases? Of course, the whole plan of medical education is predicated upon a set of assumed answers to these questions. And yet the true answers to them could only be determined by the kind of thorough-going analysis I have in mind. Some of you will perhaps remember the paper delivered by Dr. Bevan at the last congress on medical education in Chicago. Dr. Bevan had for a year been conducting such an analysis on a small scale and within the limits of his own practice. The conclusions which he reported in his paper, as the result of his study of the large number of cases coming under his observation in the twelve month period, were in the highest degree suggestive. A comprehensive analysis of the work of the medical practitioner would be an enormously expensive affair. It would also take time. If the profession should desire it, however, I am sure the money could be found. The effect of it on medical education would undoubtedly be revolutionary. In place of the present guesswork determinations, we should then have perfectly definite reasons for deciding on the amounts and the phases of pathology or chemistry or gynecology that the young practitioner should have mastered before he can safely be given a license to practice medicine.

Medical education has wide social ramifications. The whole social body is vitally concerned in the results of it. In the literal and physical sense it involves the life of the nation. Society is also concerned with the time required to prepare medical practitioners, and with the financial cost of the preparation. The social expense both in time and money is now enormous. Society must have the best returns for the money, and for the time of its young men and women, which is infinitely more precious. Those of us who are directly or indirectly responsible for medical education are under a solemn obligation to society to see that neither time nor money are squandered.

DISCUSSION

CHANCELLOR S. AVERY, University of Nebraska: I have not much of anything to say in the way of discussion, but I am going to talk just the same. I remember one time at a meeting of the Schoolmasters' Club at which your President presided, he called on me without any preparation and without the privilege of reading the paper or getting any thoughts together. I made a few remarks as best I could and said it was the first time that Cutter had the edge on me. They thought I was funny, but I was wholly innocent.

I want to explain to Dr. Capen that if I say anything in connection with this that is not highly complimentary, I mean it as a joke.

I was thinking, when he was quoting the dissatisfaction of eminent men, especially of eminent educators and practitioners in the medical field, that they were not entirely satisfied, in fact were quite dissatisfied with the results obtained, of an occasion when I was in a mathematics gathering representing a combination of high school and university professors. Some one of the high school men was moved to remark that the professors of mathematics in universities had written the textbooks, had trained the teachers, had prescribed the courses of study, and were now unanimously condemning the results.

There is such a thing as noble discontent, dissatisfaction that represents progress; so I look on Dr. Capen's address as something that should not disconcert us too much but, on the contrary, should be stimulating. I am very glad to hear a discussion of this subject from one who has given so much of his thought and attention in recent years to, let me say, comparative pedagogy. I do not think that there is a chair of comparative pedagogy in any of our institutions, but there will be; there are chairs for everything else.

I was once at a gathering where there was an altruistic discussion of what were the dearest words in the English language, and the suggestion was made that "God," "home," and "native land" were the three dearest words. I was moved to remark that for a college president

there were perhaps only two, and they were "funds available." Dr. Capen is true to form in counting the cost of medical education.

Personally, one of the things that seems to me very desirable for the teacher is to catch the spirit of the subject in relation to the student's plans for the future. I am personally a chemist by training and got into executive work rather accidentally some sixteen years ago and never found a way out. When I was teaching chemistry in an agricultural school, I found that I could use in a satisfactory way agricultural material to illustrate chemical principles. I could talk of potassium from the standpoint of one who wanted to use potash on the soil. I could discuss nitrogen from the standpoint of alfalfa. If I had been teaching in a mining school I should have taught chemistry from the standpoint of the miner and the mineralogist. I do believe most intensely in making a vital, intimate connection between the scientific study and what one is going to follow as his life work.

If I were teaching chemistry in a school where an important section of the work was the education of premedics, I should try to show the connection between chemistry and medicine even while teaching the subject as a general scientific course, thus stimulating the students' interest in chemistry through suggestions of its importance in connection with their future work. This, I think, is very important.

Of course, the discussion as to the aim and purpose of education is an endless one; it should be, because we should always be thinking on the subject. If we did not think, if we did not have differences of opinion, if we did not have doubts and misgivings, it would spell educational stagnation in all lines. If Dr. Capen has expressed radical heresies, as he implies, and I think we are not inclined to agree, they will do no harm because there is probably no group of men in the United States who could be so immune to a contagious attack of heresy as this.

I have enjoyed the paper, I have enjoyed being with you, and I think I should not try to discuss seriously what Dr. Capen has said. I find the thought stimulating, and when in private and in confidence I ask my own Dean what we ought really to do in the way of broadening and liberalizing the premedical course, he will tell me also in confidence. Then I shall know a good deal more than now what I have gotten out of Dr. Capen's paper.

Dr. S. P. Brooks, Baylor University: I am merely an administrator doing my best with my limitations. As the work has fallen to my office, I have been at a disadvantage in several instances of refusing admission to men with master's degrees from eastern institutions because they did not have a little bit of chemistry or a little bit of physics or a little bit of some other unpronouncable thing. I do not know whether or not Dr. Capen will show us the way out. He has made this crowd think, and more thinking needs to be done before we shall remedy the troubles. I have not any doubt about the accuracy of his statement that we now have six years of training instead of four, or seven as the case may be, and the correlation must go on. When we attempt to define the ability

of a man who comes to a medical school on the ground that he has certain elements of culture or ability to study, instead of certain prescribed technical work, who is going to make the decision? We must have some sort of coin of the realm and the stamp on it. Certain it is, that in the evolution of medicine we have made great progress under the system in practice now. Let us do nothing that will hinder further progress.

Dr. Henry Page, University of Cincinnati: I did not intend to speak at this meeting on the question which Dr. Capen has brought before you, although I have given it a great deal of thought. As Dr. Capen, however, has referred to himself as a "minority of one," I am impelled to testify that I agree with him and his minority is at least a minority of two as far as this question is concerned.

I have been connected with medical education for only three years. Coming in from the outside, I naturally have an outsider's viewpoint, which, perhaps, explains why I agree with Dr. Capen. Having this viewpoint, it has been rather depressing to me to see that the curriculum has for years been almost the sole subject of discussion in this body by the Council of Medical Education and in the magazines. We have rearranged it and rearranged it again, but no one is satisfied. It has not a shred of reputation left. Nevertheless you and I are still hanging on to it like a barnacle to a rock.

Dr. Capen has intimated—and I wish to emphasize his point—that inasmuch as the united efforts of the most brainy men in our schools have failed to find a remedy for the sins of the curriculum, it is a fair assumption that the essential difficulty is not in the curriculum but in the theory or policy of education which is responsible for the curriculum.

To clear up this question I have asked a large number of educators what purpose the curriculum was designed to accomplish. The answer has always been that it is intended to turn out the highest type of doctor, but when one seeks a description of what contribution the medical school shall make in the process of turning out the "highest type of doctor" one begins to realize that a confusion of opinion exists in the minds of every faculty as to the specifications which describe the end product.

In all faculties the most capable men are, for example, more or less divided into the following opposing groups:

The first group believes, or acts as if it believes, that the scientific branches of medicine should be taught primarily as a contribution to culture and incidentally as a contribution to medicine. This group is in the saddle at present and this explains, perhaps, why our curriculum is divided into "water-tight compartments."

The second group just as firmly believes that medical education is a strictly vocational problem. This group denies that cultural discipline *per se* has any legitimate place in the curriculum and that our only purpose is to make a practical doctor. The extremist of this group says to the junior student: "Forget your first two years now and I'll teach you to be a doctor."

Without discussing the merits of either of these opposing views, I mention them to illustrate the fact that faculties can not decide upon a definite educational policy because they have not decided on their objective. It seems reasonable to infer that until they do so the curriculum can neither be correlated, simplified nor untangled.

It is, perhaps, just as possible to educate the finest type of doctors by the cultural method as it is to educate them by the vocational method. This is not the point at issue. The only point I now emphasize is that our educational problem will continue to trouble us until we decide upon one of these opposing ideals or policies, or else adopt a practical compromise between the two.

I wish to speak of standardization—a subject which also has much to do with our dissatisfaction with the curriculum and education in general. A few years ago Mr. Flexner—a layman—was the active agent in bringing about a rigid standardization of medical education. This was, I believe, the greatest contribution ever made to medicine. Mr. Flexner's views were supported by this body, the American Medical Association and the state boards of licensure, and medicine was raised to a very exalted position.

In spite of this fact, no person has ever been more criticized than Mr. Flexner. The profession has felt humiliated because a layman has entered into our house to give it a cleaning. We have felt, perhaps, that we should have done our own cleaning. The profession also feels that a rigid standardization such as has been imposed on medical education was not in accord with sound policy. It was certain, it was said, to land us into difficulties more dangerous than those it proposed to remedy.

Standardization of routine is an unsound policy unquestionably. It was justified only because it was the necessary agent to bring about the standardization of an ideal of higher education. Medicine was put in shackles because it was running wild and force was necessary to compel us to accept and live up to a higher ideal.

We need not now enter into a defense of this policy. We cannot discuss now the question as to whether the end justified the means. We have the end condition and its problems before us.

The old ideal has been practically realized, but the standardization of routine remains even though its shackles are no longer needed. Our mission now is to formulate and crystallize a more advanced ideal and to put an end to the standardization of routine which is no longer required, but which exists as a positive bar to a realization of future progress. We are tied by our standardization to an ideal which belonged to a generation about to pass away.

Dr. Capen has given to us the "outside" viewpoint that instead of pushing forward we are consuming our energy in arranging and rearranging the shackles of our curriculum. He indicates that we have made no serious effort to cast them off because we have no definite plan

of action, no crystallization of our ideals, to guide us when we shall have reached the paths of freedom.

We hang on to the curriculum and its rigid exactions because we do not see clearly what we shall do when we are no longer compelled to keep within its protective limits. We fear to walk alone. This eminent body of educators has the brains and the power to remedy the present situation. I believe that they will. I do not believe that it will be necessary for a layman to again take the initiative in this new house cleaning which in medicine is now overdue.

I wish to advise against any radical procedure such as "scrapping the curriculum," and utterly putting an end to "standardization." The perfect curriculum of the future will be a structure built upon existing foundations and standardization is not without its virtues. Standardization of routine—no matter how desirable at the time of its inauguration —always paralyzes initiative and progress. It creates a school of routine. Standardization of ideals never fails to stimulate initiative and progress. It creates a school of thought.

This body can and should create a school of thought by laying down a standard of ideals. Our colleges, absolutely freed from the standards of routine, should then proceed toward their realization of the accepted ideal, each according to its own free will.

This I take to be the meaning Dr. Capen wishes to convey, and if my interpretation of his paper is correct, I most heartily agree with him.

Dr. Geo. M. Kober, Georgetown University: I have been very much interested in this meeting and certainly have profited, although many conflicting statements have been made, but opposition fosters the spirit of inquiry. I am one of the old school, like Dr. Keiller of Texas, who believes in fundamentals. The object of a medical school is to supply the community with competent practitioners of medicine, and one of the first requirements is that they shall be trained to become diagnosticians. For this purpose they must first know what constitutes the normal man, and they cannot know the normal man unless they have acquired fundamental knowledge such as anatomy, biochemistry and physiology. These studies should be combined with training in normal physical diagnosis in the first and second year. In the latter year bacteriology and pathology should be taught, followed in the third year by physical diagnosis and clinical subjects.

In 1904 I wrote a plan for a standard medical curriculum. A special committee recommended the adoption of a 4000 hour course proposed by me, which devoted about 1800 hours to the first two years and 2200 to clinical subjects. It was believed that a man had to know certain subjects. He might acquire more but he had to know certain fundamentals, and, therefore, a certain number of hours were allotted to each of the subjects necessary to secure a harmoniously educated physician. If the course has become burdensome, it is the fault of state examining boards, and not the framers of the original standard.

We must recognize the fact that what has been adopted is a vast improvement over what existed twenty-four years ago when the curricula hours varied from 5000 hours in some to a little over 2000 hours in other schools. The time devoted to anatomy varied all the way from 200 to 1200 hours. One school devoted over 400 hours to physiology, while another allotted less than 100. Some schools devoted over 500 hours to chemistry, and less than half as many in others. The medicine varied from 200 to over 1200 hours, and clinical instruction from a little over 200 hours to 2000 hours.

We must admit that progress has been made, and that we are turning out better men today than we did twenty-five years ago. There are, of course, certain changes in the psychology of students which are responsible, perhaps, for some of our ailments today. The fault, in all probability, may be found in the elementary schools by not insisting upon thoroughness in acquiring facts. Take for example the question of spelling, orthography, grammar and power of expressing our own language, and consider how deficient most of our students are in this fundamental requirement of every educated man, as compared with the physicians of former generations. Children who have been taught exact methods will have little difficulty to express what they know in a clear and systematic way, when they come to us as students.

The president of the University of Nebraska has very properly pointed out that the teachers in the premedical sciences should keep in mind that these students are being fitted for medical students, and such subjects as physics, biochemistry, biology, and so forth, might be modified so as to limit them to a medical view point. The student is certainly overburdened in his premedical work when he is taught sciences which have little or no relation to medicine.

On the whole, we have no occasion to regret the past. We have made progress and there is always room for improvements. One of the best addresses today was a systematic presentation of how clinical medicine should be taught. President Cutter set forth my own ideas in regard to it, although I am not a clinician. My last thirty years have been devoted to preventive medicine, but I know from the work accomplished by such distinguished clinicians as Osler that the best way to teach clinical medicine is to begin with the junior medical students in the outdoor service. No professor should consider himself above attending a dispensary or doing outdoor service. Every department should be a diagnostic clinic, in which the foundations are laid for the recognition of disease. We have fallen down over and over again because our students were not adequately trained to make, and let me emphasize again that students must know the normal man before they can differentiate.

DR. J. PARSONS SCHAEFFER, Jefferson Medical College: I enjoyed the paper. It was a very learned presentation. Thinking of the subject of anatomy I was wondering just why we are so loath to try to fit it into the curriculum in a practical way. I wonder if we are not afraid that

anatomy will be lost as a unit or individual subject, that it is in jeopardy, if we begin to teach clinical work in the first year. Should first year students be given clinical contacts, I sincerely believe that the science of anatomy will be fostered, that research in anatomy will go on, that teachers of anatomy will be made just the same. I believe that the thought ever should be for the medical student. Personally, I am of the belief that the science of anatomy will not suffer by this. The science of anatomy and research should and will go forward, but the making of anatomists and physiologists, and the getting of much anatomy and physiology that we expect of students today, is as much postgraduate work as is the making of a surgeon, an ophthalmologist, an otologist or a rhinologist.

This is my thought regarding anatomy. I do not belittle the subject. I sincerely believe that the man who teaches anatomy should believe in the subject he teaches, but in the undergraduate work the first thought should be for the student, since few become anatomists, the vast majority becoming general practitioners of medicine. The few who have laboratory leanings will be found and should be provided for accordingly. I would make special and abundant provision for such students.

DR. CARL J. WIGGERS, Western Reserve University: The question of theory and practice, it seems to me, is one that is often misunderstood even in the medical profession. The question of whether fundamental subjects such as anatomy and physiology are theory and the rest is practical work in medicine ought to be emphasized most thoroughly. Is the discovery of insulin, which was made in a physiologic laboratory and has probably done more for the cure of disease than any thing in many a year, just a matter of theory? Yet it is physiology and it is being taught as such. Is the tubercle bacillus a theory? Is arsphenanun a theory? Such things are taught in the subjects of physiology, pharmacology and bacteriology, and I hope that it is simply a sort of simile that the Chancellor uses in referring to theory and practice.

What is disease, as I have often asked my classes and students when I present elementary subjects. We have in the body certain cells. Each cell is a little chemical laboratory. If the chemical and physical processes are going on properly in these little laboratories in the body, we are having a normal function. Disease is nothing but an experiment, as Dr. Meltzer once expressed it, that Nature is performing in these little laboratories, and we in the elementary subjects try to perform similar experiments to get students to understand the great experiment that Nature is performing. So I rather resent the suggestion that we in the fundamental subjects are theorists and that the only practical part of the work that the student gets is in his junior or senior years.

Then the related subjects of correlation comes up. Correlation is a wonderful word, and I think we all believe that correlation should be carried to the extreme in medical teaching. As to the method of correlating, there might be some difference of opinion. Some believe that we

should correlate at once with the clinical teachings; some believe it should be done a little later, in the clinical years, not with theoretical subjects but with basic, practical fundamental subjects that underlie the teaching of medicine and the treatment of disease. But we all try to correlate, and I am optimistic to this extent, at least, that I believe correlation is at present going on to a far greater extent than we sometimes think. The feeling that our educational systems should be changed is in the air; it is an infection that is spreading; it is a belief that education is all wrong—it does not matter whether it is medical education, education of my boy in the primary grades or another boy in the high school—whatever our system of education is, it is wrong. We have not done as well as we can do and the remedy is not to proceed by gradual evolution but we must have a revolution which upsets a system of education as abruptly as it upsets a government. Whether it builds up again as well we must ponder. I am in favor of proceeding slowly by the process of evolution.

Dr. Samuel P. Capen, University of Buffalo: I have been very much more politely treated than I anticipated. I think that my fundamental contentions were hardly assailed.

I would like to stress one point, and that is the matter of state regulation. You are in the grip of the states, and the mechanizing of medical education through state regulation in a great many states now is something that is bound to become more and more irksome to you, more and more of a drag on progress as the years go on, unless steps are taken to modify existing state requirements. I am as positive of that as I am that the sun will rise tomorrow.

I should like to set myself right. I seem to have been misunderstood on one point. I am not for upsetting standards in medical education. I tried in the first few moments of my paper to pay my respects to the progress of medical education. It has been absolutely phenomenal. It is a thing which any American interested in education in general boasts about at home and when he goes abroad he boasts about it still more, because it is the outstanding thing we have done in this country. I would not counsel taking a single backward step. The only thing is that in our progress we have built up a kind of defense mechanism which now we have outgrown, and that is this whole mechanical device of hours and years and other types of quantitative standards. What we need now to galvanize medical education is to get back to another type of measurement. That is not a problem of medical education alone, although I think it is true that medical education has sinned more in this direction than any other phase of professional education in the country.

With respect to the remarks of the last speaker, I was not even aware that I was suggesting a revolution. I am as averse to revolutions as he could be. It seems to me the only way we can proceed is step by step, but if we have certain principles which we recognize as sound, which have been proved to be valid in all other fields of education, then it seems

to me we cannot ignore those principles in attacking the particular problems that lie in this field. That was the whole burden of my song.

I am something of a connoisseur in associations. It happened to be my job for some eight years to circulate about the country and visit not only universities but attend association meetings everywhere. By accident I think, certainly not by desire of my own, this is the first time that I have met with this Association, although I have read your proceedings diligently for a number of years. I have been vastly impressed, first in the indirect way in which one gains impressions through reading and then again as I have sat with you today more vividly, with the interest and vitality of this Association, just in the matter of attacking the fundamental educational problem that you have before you.

Associations rise and set. They rise when there is a real problem; the interest becomes keen and the meetings are splendid. Then the problem is more or less settled for a while and the association that has dealt with it becomes fearfully dull and sometimes if it doesn't die it ought to.

If I am any judge, this Association is galvanized by the idea that medical education has some very important pedagogical problems as well as scientific problems. On those you are focusing all your attention. I would predict that you are likely to make one of the important contributions to educational theory and science, and I am very grateful to you for giving me this opportunity of appearing before you and taking a shot at some of your idols.

THE INTERN PROBLEM

NATHANIEL W. FAXON
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A study of the intern problem develops four factors for consideration:

1. Where shall the intern be trained?
2. How shall he be trained?
3. Who shall control his training?
4. How shall the requisite number be obtained?

The first and second factors are essential and basic; the third is nonessential, being an administrative detail; the fourth is largely an economic condition.

Standardization of medical schools and medical curricula improved medical education. Similar standardization of intern training hospitals and of the intern service should improve intern education. It is essential that hospitals desiring to train interns should conform to a standard that will assure the intern proper training and educational compensation commensurate with the time spent. It is equally essential that a hospital conforming to such standards be assured of certainty of intern service.

WHERE THE INTERN SHALL BE TRAINED

A standardization of the essentials of a hospital suitable for intern training has already been published by the Council on Medical Education and Hospitals of the American Medical Association. This schedule of essentials of a hospital approved for interns requires that—

1. There shall be an organized staff willing to assume the obligation of teaching interns by personal instruction and by monthly clinical conferences.

2. The hospital must have a pathological department, suitable laboratories, roentgen-ray equipment and roentgenologist, library, and proper quarters for interns.

3. Complete records of cases must be systematically taken and properly filed under the care of a librarian.

4. The work of the interns must be regulated so that they will methodically take up history writing, clinical laboratory

> work, necropsies, roentgen-ray, anesthesia, obstetrics, surgical dressings, operations, responsibility for the diagnosis and care of patients, etc. Without specifically so stating, it is suggested that where a nonrotating service is chosen, that additional service be taken that will supply the deficiency in training.

The essentials set forth are sufficiently general to allow latitude of application under varying conditions and have the force of unprejudiced and central authority. The schedule recognizes the impossibility of all hospitals complying with such standards, but maintains that only such hospitals as can do so are suitable for the training of interns. A list of approved hospitals is now published each year.

Hospitals that cannot meet such requirements, either because of small size, limited class of patients, as in special hospitals, or inadequate equipment, should employ residents, who may be paid or unpaid, according to the educational opportunities offered.

At the present time there are nearly as many forms of service as there are hospitals and the length of service varies from six to thirty months. Just as it is dsirable to have some standard regarding the requirements for hospitals for intern training, so it is desirable to develop a standard course of training.

The form of service selected must first have educational value, and, second, it must provide hospital and patient with service. These two demands are conflicting. The average intern needs a course giving practical experience in laboratory examinations, medicine, surgery and obstetrics to fit him for general practice and to provide a foundation for further study. This is best accomplished by the rotating service. On the other hand, continuity of service is undoubtedly for the best interest of the patient, and contributes greatly to the comfort and efficiency of the staff and administration of the hospital. This is best accomplished by the nonrotating service and the resident or graduate intern service.

General hospitals having departments of medicine, surgery and obstetrics, and equipped with suitable laboratories, provide the best conditions for a basic intern training by means of a rotating service wherein each intern passes in turn through each clinical department, and spends a similar period in the laboratory and pathological department. In order to provide that continuity

so necessary for the correct carrying out of the directions of the staff and the proper treatment of patients, it is necessary to supplement such a rotating service with a resident service. It will be readily appreciated that interns serving a rotating service cannot be relied on to take more than a small part of the responsible care of patients. Their duties should be mainly the simpler routine work, assisting the resident, and in general gaining experience of the practical application of medical knowledge, without bearing much responsibility of the care of the patient. It would be unfair to the patient to place responsibility on such an intern. Such cares must be carried by one more experienced and of greater permanency. Such can be had in the resident, who will have had the training of the previous year's rotating service and who will remain in one department through the following year. Residencies also offer additional opportunities to those interns who desire to continue their training.

The comparative merits of the one-year and two-year rotating service may be stated as follows: The single year does not prolong the period of training for the medical graduate beyond the shortest possible time commensurate with giving some practical experience in the major departments. Additional training may then be carried on in the special fields of medicine, such as surgery, internal medicine, orthopedics, ear, nose and throat, etc., without unreasonable prolongation of the total period necessary to provide a general foundation in the major departments, plus further training in the chosen specialty. It will tend to encourage general practice and discourage the early choice of a specialty.

On the other hand, it can at best give but an imperfect and superficial experience in the several departments and it will require more interns to fill the positions offered by hospitals. As it is desirable to have only half of the interns enter and graduate at one time, it will be best for some to enter in July and the remainder in January, which means a loss of six months' time for some unless some special work can be found with which to fill in this period.

The two-year rotating internship undoubtedly will give a better training, will require fewer interns and will permit all places to be filled in July immediately after graduation. On the

other hand, it adds two years instead of one to the four years of medical school and if the graduate intern desires to continue his training in special departments three or four years are required before he can begin practice.

In the majority of cases a rotating service of one year will provide a foundation for further training and will be the minimum training necessary to equip the medical graduate for active practice in the community. Many hospitals, however, are compelled to maintain larger services in surgery than in medicine or obstetrics. These require either more interns or more time of a smaller number of interns to carry on the work of the larger service. Local conditions may add departments of pediatrics, orthopedics, neurology, etc., to the major departments, the work of which must be carried on by interns and residents. This must result either in lengthening the internship or in reducing the time spent in each department to an unprofitably short period. In order that these varying conditions may be successfully met, it is obviously unwise to insist upon the adoption of any rigid form of rotating service. A service of one year may be adequate for the needs of one hospital, while two years may be necessary for another, and an intermediary period best suited for a third. It must suffice to lay down the general principles involved and allow each hospital to work out that form of service best adapted to its needs, adhering as closely as possible to a basic rotating intern service of one year.

Were time not a factor, it could be stated unhesitatingly that it would be more profitable for an intern to take service in one department of medicine at a time. But this would mean a year or more in medicine, another year or so in surgery, and so on. Such services give better training to the intern and better service to the hospital. If, however, only one department of medicine is taken up, such service gives a one-sided training, omits instruction in important subjects and promotes early specializing. It would, therefore, seem that such services should best be entered after the intern has completed a basic training and has decided in what department of medicine he desires to perfect himself.

The value of the nonrotating service is most apparent in the special hospitals, such as maternity, orthopedic, eye, ear, etc., and in certain of the outstanding larger and older hospitals of

the country which have developed intern services of great value, even though they are strictly limited to one department, usually medicine or surgery. Internships in all of these hospitals equal or excel in educational value and in practical experience residencies in smaller hospitals. These should be retained as at present, or modified so as to embrace the good features of the rotating service while retaining their own advantages. It is probably requiring too much to request that if wholly nonrotating, they be filled only by graduates of the basic internship, but such would be the ideal arrangement.

It would, therefore, seem fair to suggest that a rotating service of one year, providing training in laboratory work, medicine, surgery and obstetrics, be established as the standard internship. Some flexibility should be allowed permitting extension of training to other departments of medicine, with increasing length of service up to two years, so that varying conditions may be met. Increased educational value should accompany such extension of time and service.

Residences for graduate interns should be established to improve the service to patients and to provide opportunities for further training.

Nonrotating internships should be encouraged in special hospitals for those graduate interns who wish to perfect themselves in special departments of medicine.

At the present time the right to control the intern period is asserted by some medical schools and by some state boards of licensure, but in most of the states such control still rests with the hospitals. The adoption by some medical schools of a fifth, or intern year, which much be satisfactorily completed before the degree of M. D. is granted, has resulted, first, in the placing of their graduates in hospitals suitable for intern training; second, in guaranteeing to hospitals the certainty that interns would report and complete their services. On the whole, the plan has been considered as satisfactory by those who have adopted it. On the other hand, it must be noted that it compels the addition of another year to medical education and that, except in university hospitals, that it is difficult to control. Control of the intern period, although an interesting administrative detail, is nevertheless not essential to the working out

of the intern problem. Those schools adopting the intern year as part of their curriculum should accept the American Medical Association standard for hospitals for intern training and not complicate the situation by establishing standards of their own. They must also allow hospitals (which is usually done) the right to hold examinations of interns and to appoint them as temporary members of the staff.

For many years one of the greatest sources of inconvenience to both medical schools and hospitals has been the irregular dates for holding these examinations, which have been held from January to July, to the great demoralization of student morale and studies during their last half year. Joint action by the Association of American Medical Colleges and the American Hospital Association specifying certain times for these examinations seems reasonable and would eliminate this difficulty.*

The control of the intern period by boards of licensure must be accepted where such control has been legally adopted.

The supply of interns is largely a matter of economic adjustment, although such adjustment may be assisted by intelligent action. The latest report of the Hospital Section of the American Medical Association shows the present demand and supply of interns as follows:

Total number of internships	4656	
Internships in approved hospitals	3690	
Interns in approved hospitals	3413	
Shortage	277	or 7.5 per cent.
Internships in nonapproved hospitals	966	
Interns in nonapproved hospitals	608	
Shortage	358	or 37 per cent
Total number of medical graduates, 1923	3120	
Estimated number of medical graduates, 1924	3800	
Estimated number of medical graduates, 1925	4200	

Supplementing the total number of interns 4,021 there are 3,912 residents distinct from interns, both in the fact that they

*The Intern Committee of the American Hospital Association will be glad to take this up with the representatives of the Association of American Medical Colleges.

are generally paid and that the educational value of the services offered are not considered as essential.

Additional sources of supply of interns are found in the filling of a limited number of internships by practicing physicians serving for review and additional experience. The employment of nonmedical technicians for relieving interns of certain nonmedical work and of such medical duties as laboratory examinations and history taking is being tried out in certain hospitals. If the assumption is correct that hospitals should meet a required standard for training interns and that only approved hospitals should train interns, and that all other hospitals should use graduate interns as paid or unpaid residents, according to the educational opportunities offered, then it will be seen that there will be no shortage of interns, as the number of graduates alone in 1924 (3,800) will exceed the number of internships in approved hospitals (3,700). That this will impose some hardships and expense upon nonapproved hospitals is true, but it is economically more correct for them to bear this burden than that the intern should be exploited or imperfectly trained.

The conclusions reached, therefore, are:

FIRST: That there should be established a basic rotating internship of one year, which may be extended to not more than two years under certain conditions. Nonrotating internships in special hospitals and certain general hospitals. Additional training to be offered by residencies in approved and nonapproved hospitals.

SECOND: That internships should be offered only in approved hospitals.

THIRD: That examinations for internships be held only at specified times—the dates to be fixed by joint agreement of the Association of American Medical Colleges and the American Hospital Association.

FOURTH: That the control of the intern period need not be uniform.

FIFTH: That if the above requirements are met there will be no shortage of interns.

APPENDIX

Intern Service in General Hospital of 100 Beds: Minimum service of 4 interns and 2 residents. Intern service of 12 months; resident service of 12 months.

	A	B	C	D
1st 3 months	Laboratory	Obstetrics	.....	.....
2nd 3 months	Surgery	Laboratory	.....	.....
3rd 3 months	Medicine	Surgery	Laboratory	Obstetrics
4th 3 months	Obstetrics	Medicine	Surgery	Laboratory
1st 3 months	Laboratory	Obstetrics	Medicine	Surgery
2nd 3 months	Surgery	Laboratory	Obstetrics	Medicine

Surgical resident covers surgery and obstetrics for 12 months.

Medical resident covers medicine, including pediatrics and laboratory, for 12 months.

Intern services begin July 1 and January 1.

Intern Service in Hospital of 200 Beds, having departments of medicine, two divisions of surgery, obstetrics, pediatrics and laboratory. Minimum service of 6 interns and 3 residents. Intern service of 12 months; resident service of 12 months.

	A	B	C
1st 2 months	Laboratory	Medicine	Surgery 1
2nd 2 months	Pediatrics	Laboratory	Medicine
3rd 2 months	Obstetrics	Pediatrics	Laboratory
4th 2 months	Surgery 2	Obstetrics	Pediatrics
5th 2 months	Surgery 1	Surgery 2	Obstetrics
6th 2 months	Medicine	Surgery 1	Surgery 2

	D	E	F
1st 2 months	Surgery 2	Obstetrics	Pediatrics
2nd 2 months	Surgery 1	Surgery 2	Obstetrics
3rd 2 months	Medicine	Surgery 1	Surgery 2
4th 2 months	Laboratory	Medicine	Surgery 1
5th 2 months	Pediatrics	Laboratory	Medicine
6th 2 months	Obstetrics	Pediatrics	Laboratory

Intern services begin July 1 and January 1.

Surgical resident covers both surgical services.

Obstetric resident.

Medical resident.

Intern Service in Hospital of 300 Beds, having departments of medicine, two surgical divisions, obstetrics, orthopedics and pediatrics and laboratory. Intern service of 12 interns and 1 resident. Intern service

of 24 months; resident service of 12 months or longer. Intern services begin July 1.

			A	B	C
1st	2	months	Orthopedics	Medicine	Surgery 1
2nd	2	months	Pediatrics	Orthopedics	Medicine
3rd	2	months	Obstetrics	Pediatrics	Orthopedics
4th	2	months	Surgery 2	Obstetrics	Pediatrics
5th	2	months	Surgery 1	Surgery 2	Obstetrics
6th	2	months	Medicine	Surgery 1	Surgery 2

			D	E	F
1st	2	months	Surgery 2	Obstetrics	Pediatrics
2nd	2	months	Surgery 1	Surgery 2	Obstetrics
3rd	2	months	Medicine	Surgery 1	Surgery 2
4th	2	months	Orthopedics	Medicine	Surgery 1
5th	2	months	Pediatrics	Orthopedics	Medicine
6th	2	months	Obstetrics	Pediatrics	Orthopedics

These interns then become seniors in the same services and the entering interns become juniors. The junior on the pediatric service does the laboratory work for all services.

Intern Service in Teaching Hospitals of 250 Beds. Service of 16 interns, 8 coming on service July 1 and 8 January 1. Residents in medicine, surgery, obstetrics and pediatrics, and assistant residents in medicine and surgery. Intern service of 12 months; resident service of 12 months.

			A	B	C	D
1st	6	weeks	Medicine 1	Medicine 2	Surgery 1	Surgery 2
2nd	6	weeks	Medicine 2	Medicine 1	Surgery 2	Surgery 1
3rd	6	weeks	Surgery 1	Surgery 2	Medicine 1	Medicine 2
4th	6	weeks	Surgery 2	Surgery 1	Medicine 2	Medicine 1
5th	6	weeks	Obstetrics	Pediatrics	Laboratory	Laboratory
6th	6	weeks	Pediatrics	Obstetrics	Laboratory	Laboratory
7th	6	weeks	Laboratory	Laboratory	Obstetrics	Pediatrics
8th	6	weeks	Laboratory	Laboratory	Pediatrics	Obstetrics

			E	F	G	H
1st	6	weeks	Obstetrics	Pediatrics	Laboratory	Laboratory
2nd	6	weeks	Pediatrics	Obstetrics	Laboratory	Laboratory
3rd	6	weeks	Laboratory	Laboratory	Obstetrics	Pediatrics
4th	6	weeks	Laboratory	Laboratory	Pediatrics	Obstetrics
5th	6	weeks	Medicine 1	Medicine 2	Surgery 1	Surgery 2
6th	6	weeks	Medicine 2	Medicine 1	Surgery 2	Surgery 1
7th	6	weeks	Surgery 1	Surgery 2	Medicine 1	Medicine 2
8th	6	weeks	Surgery 2	Surgery 1	Medicine 2	Medicine 1

Laboratory men would spend part time in obstetrics and pediatrics. There would therefore be

4 interns in medicine at one time, 2 juniors and 2 seniors.
4 interns in surgery at one time.
2 interns in obstetrics and 2 part time; remainder in laboratory.
2 interns in pediatrics and 2 part time; remainder in laboratory.

DISCUSSION

DR. FRED C. ZAPFFE, Secretary, Association of American Medical Colleges: Dr. Faxon has reviewed the situation well. There is not much to add, except from a point of view that has not generally been mentioned.

This Association, as you will remember, last year referred to the Executive Council the matter of appointment of interns as to time, and the Executive Council delegated me to attend the meeting of the American Hospital Association held in Milwaukee last November, Dr. Warner, the Secretary of that Association, had previously informed me of the appointment of a committee on the intern problem of which Dr. Faxon is chairman. This committee was kind enough to let me sit in when they were preparing the report.

We have heard so much about the shortage of interns that I thought it worth while to follow out an idea I had had for some time, namely that there really was not such a shortage; in fact, that there were more men available for internships than were required in approved hospitals. I prepared a questionnaire which I sent out to the 58 four year colleges in membership in this Association. All but five responded promptly. The answers were charted. (p. 120)

That chart (these are not statistics; just plain figures) shows that 2744 students graduated from the 53 medical schools that reported in 1923. Of those 2744 graduates, 2247 went into hospitals to serve internships. In other words, in round numbers twenty per cent of the graduates of these fifty-three medical schools did not take an internship. A few of the 2247 students were also taking up work in the college in connection with research or teaching as, for example, in Indiana where it appears that 58 men graduated and only one of the 8 went into active practice immediately without taking an internship. Four of those 57 graduates listed as having taken internships did not serve an internship but took places in the college as teachers, and Dr. Emerson felt that that should be regarded as the equivalent of intern work for those particular students.

These figures confirm the statement I had made previously on various occasions that we had more than enough men to fill desirable available internships.

Only 659 out of 6830 hospitals have been proved by the American Medical Association Hospital Committee. These 659 hospitals need 3690 interns, according to their records. However, in another chart that that

	1923 Graduates	Serving Internships	No. of Hosps. in which Serving	Could More Be Placed?	How Many?	Best Method of Selection Examination Appointment Certification	Time of Selection	SUGGESTIONS
Stanford University School of Medicine..	24	24	5	Yes	9	Appointment by clinical Com. of Faculty.	March	Appt. on basis of record plus recommendation of dean.
University of California Medical School...	44	42	8	No	.....	Certification	AfterMar. 15	
University of Colorado School of Medicine	23	19	11	Yes	4	Examination and Cert'tion	Before April 1	
Yale University School of Medicine.....	33	33	22	Yes	?	Appointment based on certification	January	
Georgetown University School of Medicine*	....	....	....	....	.....	.....	.....	
George Washington Univ. Medical School	16	16	5+	Yes	?	Examination or appointm't	June 1.	
Howard University School of Medicine...	27	20	5	No	.....	Certification	May	
Emory University School of Medicine... .	51	41	14	No	.....	Certification	March 1.	
University of Georgia Medical Depart....	10	9	6	Yes	8	Certification	Jan.	
Loyola University School of Medicine....	29	29	5	Yes	?	Appointment Certification	Jan.	
Northwestern University Medical School.	93	90	44	Yes	?	Examination & appointm't	April 1.	Interns select hospital from approved list.
University of Illinois College of Medicine..	80	79	33	Yes	50	Examination	?	Interns should be encouraged to study; not done now.
Rush Medical College.....	136	136	?	Yes	25–30	Depends on conditions in hospitals	By Jan. 15	One examination participated in by all hospitals in Chicago was found impractical.
Indiana University School of Medicine....	58	57	45	Yes	50–100	Appointment Certification	March	Allowance to be made for students who stay in University group.
University of Iowa College of Medicine...	44	41	16	Yes	?	Certification	April 1	
University of Kansas School of Medicine..	21	19	?	Yes	?	Certification	April 1	
University of Louisville Medical Depart...	29	16	9	No	.....	Appointment on recommendation of dean	Before March 1	Designate them residents; not interns.
Tulane University School of Medicine.....	78	73	24	Yes	15–20	Certification	Immaterial	In two local hospitals interns are appointed on recommendation of dean.
Johns Hopkins University Med. Dept.....	93	81	....	....	.....	.....	.....	8 teaching; 2 in research; 2 in practice not before Mar. 15
University of Maryland School of Medicine	51	41	18	Yes	Very Many	Certification	May 1	

	1923 Graduates	Serving Internships	No. of Hosps. in which Serving	Could More Be Placed?	How Many?	Best Method of Selection Examination Appointment Certification	Time of Selection	SUGGESTIONS
Boston University School of Medicine....	25	22	11	Yes	?	Appointment based on Certification	Before Feb. 1	Hold examination during recess period in college.
Medical School of Harvard University....	124	122	44	Yes	?	Examination and interview	?	
Tufts College Medical School.....	64	60	36	Yes	?	Appointment	March 1	
Detroit College of Medicine & Surgery....	25	25	14	Yes	10or12	Examination Certification	Not before March	The later the better.
University of Michigan Medical School...	121	115	53	?	?	Examination &certificat'n	March or April	School has nothing to do with placing interns.
University of Minnesota Medical School..	67	67	24	Yes	50	Appointment based on Certification	Jan. 1	Students choose internships in order of class standing.
St. Louis University School of Medicine..	77	75	26	No	.....	Certification	Jan. 1	
Washington University Medical School...	55	51	20	No.	.....	Certification	?	
Creighton Medical College.....	35	35	20	Yes	?	Appt. based largely on Certification	March	
University of Nebraska College of Med...	55	49	30	No	.....	Appointment Certification	February	
Albany Medical College.....	14	12	9	Yes	20 or more	Appointm't & Certification or Examina'n	March or April	In their own hospital appt. only 50% from own grads.
Columbia Univ. College of Phys. & Surg..	94	83	37	Yes	Many	Examination aided by Certification	After Easter	2 women married; 1 had service; 1 teaching.
Cornell University Medical College.....	63	59	29	Yes	?	Appointment based on Certification	April 1	
Long Island College Hospital.....	86	80	31	Yes	10+	Certification	February	
Syracuse University College of Medicine..	35	30	19	Yes	6 or 8	Combination of Examina'n Appt., Cert.		
Univer. & Bellevue Hosp. Medical College	83	77	31	No.	.....	Examination	.....	
University of Buffalo Dept. of Medicine...	49	49	18	No	.....	Examination, Appointment Certification	Xmas Holidays	
Ohio State University College of Medicine	44	38	14	Yes	8–10	Examination and Certification	After May 1	Students not taking internship are homeopathic students. Pay interns up to $25 a month.

	1923 Graduates	Serving Internships	No. of Hosps. in which serving	Could More Be Placed?	How Many?	Best Method of Selection Examination Appointment Certification	Time of Selection	SUGGESTIONS
Univ. of Cincinnati College of Medicine...	60	55	28	Yes	?	Combination of all three	Not before March	General agreement by colleges not to assist in placing interns before April 15.
Western Reserve Univ. School of Medicine	30	29	7	Yes	?	Certification	First of Yr.	
University of Oklahoma School of Med....	24	19	9	No	.....	Appointment Certification	March	
Hahnemann Medical College & Hospital..	31	31	14	Yes	20	Appointment	March	
Jefferson Medical College.....	147	147	67	Yes	50	Appointment Certification	No choice	
Univ. of Pennsylvania School of Medicine.	123	121	70	Yes	?	Appointment Certification	Middle of Senior Yr.	
University of Pittsburgh School of Med...	40	40	13	Yes	75	Appointment based on Certification	Feb. or March	
Woman's Medical College of Pennsylvania	21	19	9	Yes	4 or 5	Appointment Certification		
Univ. of Philippines College of M. & S.....	34	34	....	....	.....	.....	.....	
Medical College of State of South Carolina	25	19	10	Yes	6	Certification		
University of Tennessee College of Med.*.	....	....	....	....	.....	.....	.....	
Vanderbilt University Medical Dept.*....	....	....	....	....	.....	.....	.....	
Baylor University College of Medicine....	17	14	8	Yes	24	Certification	Feb. 1	
University of Texas Dept. of Medicine....	42	37	19	Yes	75	Certification	Jan. to March	1 served internship in senior year; 4 are instructors in anatomy.
University of Vermont College of Medicine	23	20	9	Yes	40	Examination and Certif'n.	Early	
Medical College of Virginia*.....	....	....	....	....	.....	.....	.....	
University of Virginia Dept. of Medicine..	27	25	12	Yes	?	Appointment based on Certification	March 1	
Marquette University School of Medicine.	30	26	12	Yes	25	Appointment	2d semester senior year	
Meharry Medical College.....	63	20	11	Yes	10	Certification	End of senior year	Not enough hospitals in which to place colored interns.
Totals.....	2803	2572						

*Not reporting.

Committee prepared, it appeared that only 7½ per cent of those approved hospitals were without intern service, whereas 63 per cent of the non-approved hospitals had interns. In other words, the approved hospitals were short 277 interns and the nonapproved hospitals had 608. My chart shows that approximately 500 graduates did not take any hospital position. That number would more than have filled the list for the approved hospitals and also partly, at least half, the required internships for the nonapproved hospitals. These figures are very interesting as bearing on the intern shortage.

With regard to the time of appointment. More colleges voted for March than for any other time; the majority of colleges voted for March or April. A few colleges want the appointment made earlier or later; some do not bother about it at all. One college suggests between Christmas and New Year, and one wants it done as early as possible.

Then I endowed to ascertain the preferred method of appointment. By far the greater majority of colleges prefer appointment based on certification. That means, an appointment based on certification by the Dean, leaving it entirely to the Dean to say whether a man is suitable for an internship or not.

I was glad to hear Dr. Faxon say that the hospitals would be perfectly willing to meet the wishes of the colleges in the matter of time of appointment, because that was not the idea I got when I attended the meeting of the American Hospital Association in Milwaukee. I seemed to sense that most of the men who spoke there did not care anything at all about the time of appointment; that they were principally, primarily and fundamentally only concerned in getting interns. At that time I took occasion to speak on the various problems concerned in the intern question as to why hospitals want interns, and why medical graduates want internships, etc.

There is another thing that interested me in connection with this shortage of interns, and that is how many of these hospitals are prepared to give these boys such an internship as this Association feels they should have; that is, an internship which is continuous with the fourth year of the medical curriculum—a genuine fifth or clinical year.

One of the features naturally that would interest the colleges would be whether these hospitals had any clinical laboratories. Taking them by and large, of the total number of 6830 hospitals in this country, only 44.4 per cent have a clinical laboratory. That doesn't mean that it is only the small hospital that has not a clinical laboratory, because of the 409 hospitals having over 300 beds, only 74 per cent have a clinical laboratory. Of the 915 hospitals that have between 100 and 300 beds, only 72 per cent have a clinical laboratory. Of the 2704 hospitals in the group of from 25 to 100 beds, only 50 per cent have a clinical laboratory. Of the 2731 hospitals of 25 beds or less, only 26 per cent have a laboratory. How many of these hospitals are prepared to give adequate intern training as a continuance of medical teaching? I feel that those figures support the contention I made at the American Hospital Association meeting

that this Association is not in favor of the requirement of a fifth or intern year for graduation. Too few hospitals are adequately equipped, and, anyway, until the colleges had control over the education of the intern during that year, as part of the teaching course, they would not be willing to give credit for that fifth year as a requirement for graduation.

The discussion of Dr. Schmitt's paper yesterday brought out again that that is really the sentiment of the membership of the Association, that until this Association, or its constituent colleges, had some way of controlling the teaching done during the intern year, it is not willing to support the proposition of lengthening the course to five years, the last or fifth year being a clinical or intern year.

DR. WILLIAM DARRACH, Columbia University: At the meeting last year the point was brought up as to the time that hospital appointments should be made. It seemed to meet with the approval of the Association that the hospital appointments should not be made until after a given time, preferably as late in the fourth year as was practical. I sent out a circular letter which was replied to very generously offering support and expressing the approval of the idea. When it came to trying to get anything done, however, we received almost the same answer throughout, that it was a little late to do anything for this year. That is the same answer that we got the year before, and I suppose we will get it year after year for a while. I am still optimistic, though, and believe that eventually we will do something about this. It is more of a problem than this Association can handle by itself; it is more than this Association with the American Hospital Association can solve, because it needs the co-operation of the groups in each individual place as well as the cooperation between the different cities. We have had meetings in New York for the last three years trying to accomplish something along this line. Each time we meet with about the same results—a hearty approval of the theory and an agreement to the practical application of it, provided that each individual hospital has the privilege of appointing their interns first, which makes it a little difficult.

Several schemes have been proposed of joint examinations, combined examinations of one sort or another, which I think would help a great deal.

Our local problem is an unusually difficult one because of the number of hospitals in New York and its neighboring towns. There are a good many different hospitals. A number of years ago a combined examination was tried by some of the larger hospitals, but it was given up because of its impractical character. At the same time I think that our end can be accomplished if a certain amount of unselfishness and cooperative effort is adopted by the various groups. It seems to be one of those self-evident desirable factors which everybody approves of, but is a little shy about starting and carrying through to a finish.

I think that if each one of us tries to meet the problem each in his own center, we will come to an agreement and some working basis will

be evolved which will prove practical and sound. I have no definite plan to recommend, but I hope that some will be offered.

DR. C. C. BASS, Tulane University: I do not know that I can offer any valuable discussion. The problem does not affect us to any considerable extent. Appointments are made upon the recommendation of the Dean, and although the different hospitals have somewhat different dates, there is a kind of standing rule that those who apply for two hospitals are not accepted in either, so that we are are really not worried with the problem.

So far as we are concerned, there are no hospital examinations held and we would be quite willing to agree to any date that was agreeable to others who were obliged to hold examinations.

DR. RAY LYMAN WILBUR, Stanford University: It seems to me that this question of the intern year is of unusual significance because it has now gotten into the domain of many of our other medical problems —that of the law. When state boards of medical examiners and other bodies that have to act upon a political or legal basis begin to interpret our educational processes, it increases our responsibility very much. It is particularly trying for institutions requiring the year in the hospital before giving a degree to work out these problems with the boards of examiners.

In California, as elsewhere, the State Board of Medical Examiners deals more or less technically with applicants for licenses who may have their intern year under such conditions that some clause in the law leads to difficulties.

California is a popular state for doctors and near doctors. The number of people crowding in on us is such that any reasonable excuse for withholding a license is a good excuse.

The problem to me is simply this: We have enough vacant internships in this country to absorb our medical graduates. If there are not enough immediately available, they could readily be created. Various efforts are being made to increase the quality of the hospital opportunity, and more still can be done. Except for the students who graduate and go into laboratories for special work, all of our students ought to get hospital experience. As a practical matter, shall we as educational institutions require it of our graduates, or shall we let the state boards of medical examiners require it, because one or the other body has to do it. If the university requires it, then we have to set up some form of relationship that permits us to have a reasonable control of what is done, not that we have control of what the intern does in the hospital, but that we have some kind of examination or certification at the end of that period that can count as part of the preparation for graduation.

My inclination is to take this over as an educational problem. The hospital cannot escape its responsibility in education. We cannot escape our relationship to the hospital. The hospital is under the influence of a body like this. When interns are appointed is an educational matter.

It is very significant to us. The hospitals must eventually bow to our wishes in that, and it seems to me that the hospitals can be brought to the point where they will permit us to take a large part in controlling the intern year.

Now, the intern needs other discipline and other training than that given to him in the hospital. He needs to be looking forward toward his future responsibility and to realize that he must make good with his own educational institution. It would be a little troublesome for us, no doubt, to follow the man through, make him come back to us, and set up a device to test him. We are aften rather glad when we see a class graduate. The longer I stay as a university administrator the more I recognize that two of the finest inventions in the world are graduation and death. You get rid of the students about the time you are tired of them, and if people didn't die I don't know what we would do. So we shake off this responsibility readily, I think, because we want to shake it off at graduation time. But my point of view is that in the long run it would be wiser for us to go on and take care of the intern year as an educational process rather than to allow it to become, as it will, administered by national boards of examiners or state boards on various standards which are widely different in different parts of the country.

Dr. C. Sumner Jones, University of Buffalo: We appear as the only school recommending the Christmas vacation as the time for appointment. Our administrative board and the hospitals in Buffalo tried to comply with what seemed to be the opinions from the eastern part of New York State. We considered very carefully and discussed the advantages of deferring the appointments of interns until late in the year. On the other hand, we found that our students themselves were very desirous to have the question of their intern year settled before the time when they are preparing for their final examinations. A good deal of consideration and deference was paid to the expressed wish of the students in that particular.

We realized that we would be somewhat alone in the recommendation of intern appointments during the Christmas holidays. Two weeks would thus be given students who apply away from home for internships. This plan would not interfere with their regular work, if they are to appear in person before a committee at a given hospital (a number of them went to New York City, some to Boston, two or three to Johns Hopkins, etc.), for the purpose of making their application. We felt that if we insisted upon deferring appointments until April, or late in the year, we would be going counter to the expressed wish of our students, and also it would leave them in doubt until late as to whether they would really secure an internship or not. The student mind is very much relieved, I have found, when that question is settled. The student is eager for an internship, and when he has received an appointment that question or problem is eliminated. Until it is settled he is more or less anxious, and is asking for letters to various hospitals. We sent two or three letters to California,

several to the Mid-West, and a number East. In the case of those who went to New York and applied at Bellevue, I think none were successful because of the large number of applicants for that hospital. Some of them were our very best students. In fact, we were, therefore, rather reluctant to give a letter to the New York hospitals. We advised our students against making later application, so that while we are alone, we felt justified because of the time available during the two weeks of the Christmas holidays, to allow our students to settle the intern question.

DR. ROSS V. PATTERSON, Jefferson Medical College: I see no great advantage to be gained by specifying the time of the appointment, except to relieve one of the annoyance of never getting the job quite finished in a definite period of time. I see no disadvantage to having the appointments made at any time during the session. Most of the dissatisfaction that comes out of hospital service is occasioned by students entering into contracts that they are afterward unwilling to fulfill, or hospitals selecting men on recommendations or certificates without having the opportunity of seeing them personally.

I would rather deplore the assumption of the entire responsibility of appointing students to hospitals. I would prefer that most of that responsibility should be assumed by the hospitals. I would deplore anything that makes for rigidity and inflexibility.

DR. J. M. H. ROWLAND, University of Maryland: It seems to me that this question is a matter which resolves itself into a different question in different communities. The hospitals in large cities are, as a rule, so numerous that none of the large cities have enough interns to fill the hospital services in them, and there is a tremendous demand for hospital interns in those places. Hospitals in other places do not have quite the same competition. For instance, I do not suppose that in Boston or New York or Philadelphia or Baltimore or Chicago or St. Louis there are anything like enough interns graduated from any of the schools to fill the places. In these cities there are not only the university hospitals, hospitals which are teaching hospitals, but many other splendid hospitals, and frequently they are manned by very splendid men with a great halo about them, and while the hospitals themselves are not as well qualified to take care of the interns as some of the teaching hospitals, the environment about them draws interns that probably ought not to go to them.

We would rather put off the appointment of interns until later, but we find that every year about the first of January, or sometimes earlier, and many times during the months of January and February, we have applications from a large percentage of the students to take examinations in the city of New York for New York hospitals, and other such places, too.

We find, also, that some of the best hospitals in Baltimore that are not engaged in teaching at all are beginning to draw off some of the very best of our men, so that in self-defense, if we are to have interns for

our university hospital, we must begin to think of the appointment of our interns.

I see no way to make the matter uniform unless you are going to combine with the American Hospital Association and in conjunction with that association name a time when all hospital interns shall be appointed. If everybody will live up to an agreement of that kind, of course, the hospitals may appoint their interns at that time, but electioneering for interns probably will go on in spite of that.

In Baltimore we have partially solved the problem of interns by drawing on the Middle West. For instance, in one hospital one intern is a graduate of this school; in another hospital in which we are doing teaching, two of the interns are from Creighton; two other interns in the first hospital named are from the University of Michigan. That is the way we are beginning to solve our intern problem in Baltimore. I think it depends largely on whether you can get an agreement. I do not think that any locality or any group of hospitals can settle it.

In the matter of whether or not this Association shall decide that it will recommend interns to hospitals which will continue the work of the four years as a fifth or intern year—the fact is, as I think all of us know, that many of the hospitals which are approved by the American College of Surgeons and by the American Hospital Association are hospitals which are certainly not qualified to carry on a fifth year of medical work. The very fact that a large percentage of hospitals have no efficient clinical laboratories proves that without any question at all. The hospitals in Baltimore to which we lose some of our best graduates—graduates that we would like to have in our teaching hospitals, are hospitals which do not have efficient clinical laboratories. So I think it would be impossible for the colleges to assume any responsibility for men who are in hospitals other than teaching hospitals.

DR. C. F. MARTIN, McGill University: This problem has touched us very closely, because we find that we have been compelled to change our method of appointments, due to the early acquisition of our graduates by hospitals in the United States. We have always been in the habit of considering the merits of a man for resident work after his examination for his degree. Now we find that we have to respond to requests from many of the hospitals in the United States as to the adequacy of our men to fill positions without knowing whether they are going to graduate. We would like, first of all, to be sure that they are going to graduate before we can give them certificates; and, secondly, we would like also to be able to give a certificate that means something as to his standing, because a man who stands very high deserves a better appointment.

If we are obliged in the middle of our course to allow men to come down to Philadelphia or New York, Boston, and so on, in order to get the appointment for which they may never graduate, we are using up a lot of good time, and we can only give them a certificate, subject to the possibility of their graduation.

A few years ago, before this became very pressing, we always made our appointments after the examinations in May, and the men took on their appointments on the first of September, giving them a couple of months for recovering from the strain of work. It seems to me more sound to appoint men after they have got their degree and after we know their standing than to appoint them in such a way as practically assures them they are going to get a degree, which, after all, is not very certain.

DR. W. KEILLER, University of Texas: I can not see that the objection made by the last gentleman holds. If you do not know by the end of the third year just about what the man is going to do, you do not have the kind of records of that man that you ought to have.

Our men apply early for their appointments. I am on record as preferring that these should be made between January and March. That is the students' point of view. The pick of our men want to take internships in our own hospital because it is a teaching hospital and because they know they are going to get the value of their time. They want to know whether they are going to get those internships, and if they don't they want to know soon enough to apply for good internships all over the country, and they keep me busy.

If a poor man comes to me and asks for a recommendation, I say: "Mr. So-and-So, here you have a grade of 69 or 70. You range somewhere about fiftieth in a class of seventy. I have made inquiries about your work this year and I find that is just about what you are worth. Now I will be very glad to give you this kind of a recommendation."

Mr. So-and-So has an average of 70 in his first three years in medicine. On inquiry, I find he is doing about that kind of work this year. He is a nice fellow, has good presence, and that is about what you are to expect from him. I say, "This is the sort of recommendation I can give; here it is; you can use it if you want to."

A difficulty that I can see ahead of us is that the State of Texas is in 1925 requiring an intern year. What on earth are we going to do with the 10 per cent men that I can't recommend anywhere? Have we got to take them all ourselves?

DR. C. F. MARTIN, McGill University: May I just ask the gentleman from Texas why he finds it necessary to hold a final examination at all?

DR. KEILLER: I only want to say, if I may, that I am talking of generalities.

DR. NATHANIEL W. FAXON, American Hospital Association: I had hoped that we would get an expression of opinion on more than one point brought up in the paper. Interest seems to be mainly concerning the time these examinations are to be held. From the hospital standpoint, that is the least important of many things. I think I can say that the demand for the setting of the time comes to the attention of the Intern Committee mainly from the medical school.

The hospitals are in the attitude of mind that they are ready to help out the medical school in any way that they can. If some workable agreement can be reached, I am sure hospitals will gladly accept it. I cannot guarantee to force it on all the hospitals in the country. All I can do is to recommend it to the Association.

I had hoped that there might be some expression of opinion on a basic rotating service. I think this is a point that might bear discussion.

THE NEW MEDICAL CURRICULUM

STUART GRAVES
Dean University of Louisville School of Medicine

I feel that the new medical curriculum is too important a subject for a new dean to talk about, especially when he has recently inherited a great many other problems in the reorganization of a medical school. The only excuse I have to offer for my appearance on this program is my helplessness in the hands of the Secretary, who exercised his prerogative without my knowledge.

Perhaps it may be of interest to reflect a few experiences and a few problems which have come under such circumstances. My first impulse was to resort to the usual questionnaire, but I recalled Dean Lyon's rather humorous treatment of that subject last year and dissuaded myself from the attempt to tabulate the trials and tribulations of others. My own experiences, the problems which have developed and some questions will serve, I hope, for a profitable discussion.

FIRST: What constitutes an hour in the curriculum? When I returned from Detroit and Chicago last year, I studied our schedules and found that 5,728 hours were occupied, on paper, at least, and the student had hardly time to eat lunch between 8 o'clock in the morning and 6 o'clock at night. Obviously, he had no time to think. The curriculum had grown for years, like Topsy. The adoption by this association of a schedule of 3,600-4,400 hours afforded authority with which to work, and while some teachers were loath to modify time-honored courses, the majority of the faculty realized that something had to be done and were very good in co-operating. After a series of departmental conferences, I succeeded in working out a schedule of 4,478-4,702 hours, depending on the evaulation of certain work, which will be further cut next year.

This brings up the first question I would suggest for discussion: What constitutes an hour in the curriculum? So far as I can ascertain by the study of medical school catalogs and

conversation, there are no standards of comparison between schools. How would you evaluate hours devoted to ward rounds, ward clerkships, dispensary clinics, clinico-pathological conferences, etc.? Surely, such work should be accredited in the curriculum. Shall it be evaluated as are ordinary laboratory hours in college, at one-half the value of lecture and recitation hours? And how would you evaluate laboratory hours, as in anatomy? At one-half or full time?

SECOND: What percentage of hours shall be appointed to various departments? The curriculum adopted allows considerable latitude in this respect and I presume the thing to do, within limits, is to apportion hours according to the strength of the faculty, the resources and facilities of each department. That seems to be the basis of the new Yale organization, for example.

THIRD: What is the relation of the curriculum to the fifth year? While the concensus of opinion is that a fifth year is desirable for practically every student, only a comparatively few schools require it for graduation. Yet our responsibility makes it necessary for us to consider the four-year curriculum in relation to that fifth year. It is also necessary to consider the curriculum in relation to premedical preparation. There is a widespread protest against the lengthening of the course with its increased expense to the student. It seems to me the new curriculum should be considered with relation to education before and after. Let the premedical curriculum be cleared of non-essentials and let the postmedical training be arranged so that medical students will want it.

Our school has entire professional responsibility for a city hospital which cost one million dollars ten years ago, had an average of 329 charity ward patients last year and about 60,000 dispensary visits. Our hospital postgraduate work is really a part of our curriculum. The first year affords a rotating service of twelve months. The next year affords straight medical or surgical services of twelve months under the direction of salaried teachers. We are planning to extend this to pediatrics next year if we can find the right salaried teachers. That these services are desirable for the students is indicated by the fact that about half our senior class applied for them this spring and the

applicants included most of the best men in the class. It should not be left unsaid in regard to premedical training, of course, that a broad cultural foundation is extremely desirable.

FOURTH: Can the curriculum be lengthened to advantage in the second and third years? In the discussion on the fifth year, Dr. William J. Cutter of the New York State Board last year went on record against a fifth year until the four years were better utilized. About the same time I noticed that a goodly number of students were applying for summer work in the dispensary. We utilized that desire by organizing a course of systematic clinical instruction for them. Incidentally, we found that these enthusiastic students were of service to the hospital during a summer period when it was more difficult to secure clinicians in that department.

Possibly this plan might be developed into an additional four or six months of clinical teaching at a time when the application of basic medical sciences to the clinical teaching is most valuable. Is it not more practicable than to attempt the teaching of sections throughout the course? There are several objections: (1) The need of the teacher for the summer quarter for rest and recreation, or for uninterrupted study to refresh himself; (2) the health of the teacher and the student, especially in our Southern schools; (3) the necessity of some students to earn money to help pay for their education. These obstacles could be overcome, however, and the suggestion is at least in line with the ideas of educators in other fields.

FIFTH: Hours devoted to social departments. I merely want to bring these up for discussion. Their importance was splendidly emphasized last year by Dean Emerson. It seems to me we need to consider more carefully these fields of endeavor in which the doctor should rub elbows with the great lay public. Has not the doctor too long remained aloof, standing on his own dignity? People are awakening to the value of the service the medical profession is rendering, and in more than one state they are almost savagely demanding a voice in shaping medical education and training. If the medical profession does not cooperate in these matters and guide the layman in his awakening it may be the worse for the medical profession and the worse for the public. While no more hours may be added to the

curriculum, will it not be worth while to devote a few hours to developing in our students the ideas of public service and professional responsibility and cooperation with semimedical agencies?

SIXTH: Ethics and Economics. Few catalogs show any time devoted to these subjects. I feel strongly that the young doctor about to go out should listen to carefully prepared heart-to-heart talks by carefully selected senior teachers of irreproachable character, respected personality and recognized ability, not necessarily doctors. With this in view, I am working on sixteen lectures for the last half of the senior year. A judge of the Court of Appeals is going to talk about the relation of the medical profession to the legal profession, with the good of the public in mind. A business expert, who is a fine business man of high standing, is going to tell the young doctor about sound business principles—for the good of the young doctor's family. A state officer of high ideals is going to inspire some thoughts of service to the commonwealth. While attending the funeral of the late Dr. McMurtry, former president of the American Medical Association, in his old country home recently, I was invited to dinner by one of his old colleagues. Over the fireplace hung the picture of my host's grandfather, a Scotch-Irish judge, whose keen eye looked straight through one. All about the house were the books of his father, an honored country practitioner. He himself is still practicing at 68, with all the characteristics of his father and his grandfather. He has the affection and respect of every man and woman in that cultured little Kentucky town made immortal by Ephriam McDowell. He is going to tell our seniors how to treat their fellow physicians as well as their patients, and I believe he is going to give them some ideals of medical ethics which might not be so effectively given by the heads of some $100,000 city clinics.

SEVENTH: Correlation. The really vital topic in a discussion of the curriculum is correlation. Dr. Wilbur hit the nail on the head last year when he said in effect that the problem would be solved when the so-called preclinical subjects were taught by men in sympathy with clinical medicine and the so-called clinical subjects were taught by men who knew enough about preclinical sciences to apply them. But until that time comes we

must continue our attempts at correlation. The sequence of courses, the contents of courses, the emphasis on the more important subjects, must be carefully considered by all the teachers with one objective in mind, to handle the fundamental sciences in such a way that they can and will be studied by the student for the rest of his life and applied with common sense to the problem of the diagnosis and treatment of his patient. To this end there must first be a survey of the course contents as now given.

In our school we are making a start in this direction. Our teachers of anatomy, physiology, pharmacology, bacteriology, pathology, medicine and surgery are comparing their courses, with a view to emphasizing in the basic sciences what the teachers of medicine and surgery think most important from their points of view. On the other hand, our professor of medicine is taking the sophomores during the second semester and teaching them the application of physiology, pathology and biochemistry, attempting to follow two or three weeks after given subjects have been taken up in those departments. The head of our department of medicine is attempting to do that—not his third assistant.

In the fourth year our professor of medicine has an hour once a week during which he quizzes the seniors on clinical subjects, often with a patient before him in the amphitheatre, from the standpoint of applied basic sciences. He makes the students see the value of those sciences. Again, the teachers of medicine take the sophomores during the second semester in groups in the hospital for history taking and physical diagnosis, often with patients before them. Between our departments of physiology and medicine, community of interests in teaching and research are being developed. The same holds true between our departments of biochemistry, physiology and medicine. Next year we expect to see the professor of chemistry and the professor of physiology and pharmacology appointed consultants to the city hospital, so that they will have access to the patients. The professor of gross anatomy will be the consulting Roentgenologist.

The plan for teaching pharmacology recommended yesterday by Dr. Bierring has been brought to us by the former professor

of pharmacology at McGill, who is now our professor of physiology and pharmacology. He has an assistant from the department of medicine who teaches applied pharmacology in the junior year. We are trying to get away from the idea that there is any division between the first and last half of the course. There really is not.

The time-honored clinico-pathological conference is soon to be changed into a teacher-student conference in which a given case will be reviewed by senior students before both upper classes from the standpoints of embryology, anatomy, physiology, biochemistry, bacteriology, pathology, diagnosis and treatment. At these weekly conferences I hope to secure the attendance of the heads of all these departments to discuss the student work. This is a far cry from the condition which existed in a large Eastern school a few years ago, so I was told last night, when the heads of two major departments would not speak to each other.

In pathology for years I have taken the second year students to the autopsy room every fourth morning, and, two weeks after beginning the study of inflammation, have shown them specimens of pericarditis, pleurisy, meningitis, appendicitis, salpingitis, etc., just to impress on them that inflammation is largely the same everywhere. Pathologic physiology will depend on the part involved. The specimens are indexed and cross-indexed. In place of textbooks we use our own records and the student learns, before he has studied clinical medicine, that the lung he is looking at comes from a man who was admitted with elevated temperature, rapid breathing, pain in his side and a cough. He does not forget those things and he recalls his pathology, and sees with greater understanding when he studies pneumonia later. They are not book subjects then. He understands systemic diseases and his examinations are designed to make him think in terms of fundamental sciences applied to the whole organism.

Correlation of the curriculum is not so difficult a problem if we can only establish a common point of view among unselfish, enthusiastic teachers in different departments. To carry this out best, the faculty must have a skeleton, at least, of scientifically trained, clinical teachers on an academic basis.

EIGHTH: What is the ultimate object of the curriculum? In conclusion, may I raise this question? Across the United States must exist a string of great schools, heavily endowed, for the training primarily of teachers and highly developed investigators. From these schools must flow the stream which will keep fresh the intellect, the search after truth, the ideals of progress in the smaller schools. But let us not forget that the average undergraduate medical curriculum must primarily be to train carefully selected students into general practitioners of the highest character and the greatest skill, who will give cheerful aid to those helpless patients who now can hardly pick their path through the maze of specialists, diagnosticians and every other kind of a doctor except the one who will tell him what is the matter with him and give him relief at a cost within his means. Too often, in his search, the patient falls into the hands of the charlatan. Who is to blame? Please do not misunderstand my appeal. Without the investigative spirit any teacher or practitioner is dead; but, with a budget of $100,000, it is better to spend $20,000 in pure research and $80,000 in high-class instruction of medical students than to spend $50,000 on a few high-priced men who rarely see the students and spread out the remainder on second-rate medical training.

DISCUSSION

DR. C. A. HAMANN, Western Reserve University: There is no special feature about our eleven months in the senior year. That plan was introduced a number of years ago and the students, at the completion of the third year and after a month's vacation, enter on clinical clerkships in the two large hospitals under our control. The plan has worked very satisfactorily. There has been no complaint on the part of the students. In fact, I think they rather like it. This may be evidenced further, perhaps, by the fact that the students at the end of their second year frequently ask to be allowed to attend the dispensaries in the summer vacation. We have thus been enabled to lengthen the course to get in more instruction.

DR. HUGH CABOT, University of Michigan: I do not know how to answer the question which Dr. Graves asked except by reference to the clock. I have always regarded the clock as the best method of deciding how many hours a student could work to advantage. I think one of the ideas which chiefly concerned the committee which got out the report a year ago was that the student's time was so occupied with the attempt to imbibe learning that he stopped automatically at a certain time. The

report was, in fact, an attempt to put on record the time at which we believed he should stop. It has seemed to me that the curriculum as it has stood in many schools, in which group Michigan should be included, has been a process of accretion in which a good deal was added and nothing was taken off. No attempt was made, I think, to dig out the essentials. That was left to the student. He decided very easily and very simply what was necessary. He decided when he went to sleep and when he woke up; if, indeed, he woke up at all.

The attempt to set a limit in hours was, I think, primarily an attempt to force a certain reconstruction of the course, to force people who had been, for instance, teaching 1,200 hours in a certain subject to get that subject into 800 hours, which might possibly result (I do not suggest it as a probability) in some revision of the content.

Again, I think it was an attempt to chuck a monkey wrench into the machinery which was perhaps running more smoothly for the professor than for the student, and that a little monkey wrench in that machinery might not do extensive damage.

In an attempt to work out in my own mind any distinction between a lecture hour and an hour spent, for instance, in a ward walk, I could come to no conclusion. I am quite clear that some hours spent in meandering about the wards are of more value than some hours spent in listening to what might more readily be obtained from a textbook of the vintage of 1870. It becomes a qualitative matter, and I can assort it only in terms of the number of hours in a day which an ordinary man, or perhaps even an extraordinary man, can be alleged to think to advantage.

I think the modern medical student is driven pretty hard. I have come to the conclusion that if I had been treated as roughly as he is, I should probably have devoted myself to a more muscular and less intellectual piece of work, probably to the advantage of the work.

I do see, quite frequently, students who seem to me to have pretty firstclass heads, but not very fast minds, who cannot keep the pace, and yet, I am well satisfied, belong in medicine. I think a reduction of the hours takes cognizance of the different rate at which these people acquire knowledge.

It is probably true that in a schedule such as ours, for instance, which used to run until six o'clock and half past six and seven, which now has perforce to end theoretically at four o'clock and practically at five, it gives a little more room for the slow-moving but satisfactory person to make the grade. The fast student will get through at four o'clock and will go off about his business, possibly to get some air, certainly to have a little chance in which to shake down what has been put into his head. The slower student can have a little extra time in which to make up, and probably to the advantage of the end product.

I have felt pretty dissatisfied with the necessity of providing "transport" for certain students whom I believed that on a different schedule we should be able to keep. I believe we have sloughed off by one method

or another students who might have been retained because in the crowded curriculum with hours quite, I think, beyond their capacity to use them, they have not been able to make the grade. That, I think, was importantly in the mind of the committee and this was one method of getting at it. I thing it was one method of jolting the rigid curriculum. I hope it to be the beginning only. I hope that this Association will see its way to take the whole curriculum, including the premedical part of the curriculum, and look it over very searchingly to be sure that we really believe that the things which we now require are necessary. I do not believe it. I think we have come to a point where having made our requirements very rigid, we ought to consider very carefully whether they are not altogether too rigid.

I regard this Association as best fitted to do that work, because at this time the responsibility for medical teaching has been transferred to the universities, has come from semi- or quasi-educational bodies and gone where it must ultimately lie—upon the universities. I think it ought to be treated now as a university problem and not simply as a problem in highly technical education in which people with highly technical training wield the whole responsibility.

I want to see the whole question taken up very broadly, very deliberately and very carefully. There is no hurry, but I am not at all satisfied with our present situation, and I hope this body will take measures to start machinery which will land us with a body of fact which we shall be able to consider, digest and act on.

Dr. Abram T. Kerr, Cornell University: I did not expect to speak to you in regard to the curriculum. I do not know that I am competent to speak on it, as the teaching work that we have in Ithaca, where I am, concerns only the first year students. However, I have been thinking a great deal about curricula, and since 1899 I have been fooling around with them more or less, and I believe that it does not make so much difference just what sort of a curriculum we do have. We have made tremendous progress in the last thirty years, but I believe that the curriculum has not been the most important thing. It is much more important, of the greatest importance, that we should have the right sort of teachers. Our teachers all are different. They must each in their own way teach what they have to teach, and some of them can put over the ideas which they are trying to get to the students in one way and some in another. It takes more time to do it one way than it does another way. Therefore, the curricula in different colleges must vary considerably to suit local conditions and mainly to fit in with the varied gifts and training of the teachers in each institution. This applies as well to the subject matter as to the number of hours allotted to each subject.

In regard to the time element, of course, at present the only thing we have to measure by is what we call the hour; but, unfortunately, we do not figure this in terms of what the student does or can do. We figure it in the time that we assign him to do certain things and in which

we are going to try and feed the medical curriculum out to him. There is no question but that what one lecturer may call an hour's time is very different from an hour with another lecturer. One may take a lot of the student's time and the other very little. It takes an hour of our time with the student; it may take much of his time or very little of his time outside the class room, and the same applies to an hour in clinic or an hour in laboratory.

We are using, it seems to me, a kind of measure which we must change a little bit. It is not an exact measure in any kind of way. We should use a measure that will take account of time and effort required of the average student, both in the class room and outside. We have been discussing the student's time in assigned exercises and the preparation for them, but what is he doing with all the rest of his time, if he has any, and what are we doing for him so that he may use it to the best advantage?

Of course, the thing we want to do is to give the student an opportunity to make a physician of himself. We may delude ourselves that we are making doctors of these men and women who come to us, but that is not what we are really doing; and when we get through with them and turn them out on the world they are only ready to begin to make doctors of themselves. That is the way I look at it.

If we give them the kind of an education that we ought to give them, we will give them a training so that when we do turn them out they are prepared to go on and educate themselves so they may grow and not stop where we leave them. If we spoon-feed them too much or give them too much lecture or laboratory work then the men and women we turn out are not trained in such a way that they are independent and we have not taught them how they can go on and get their education and become doctors, then they are never going to be educated physicians. I presume some of them never are.

We discussed yesterday the question of what is the goal, what is the aim, of medical education. Of course, we are trying to make doctors of these men, but there is no measure of that. If you take any hundred of the best men and measure them up as to what they are, you will find all sorts. It is a very different sort of a training that they have had and a very different sort of a goal they have reached, but they are all good doctors. Physicians must be trained, however, it seems to me, with the idea of being prepared to render a certain service to the community. That service is not standardized and it never can be standardized.

The thing that I really object to in a good many of the things that we have done in this Association is that there has been altogether too much standardization and this is particularly bad when it has been taken up by the states and enacted into laws. We are getting things in altogether too hard and fast lines. There are different conditions to be met in different parts of the country and in the same location conditions vary with different faculties. Almost all of us who are teaching are con-

scientiously trying in our own way to obtain good results and to make good doctors of our students; whether or not we succeed can be determined only by the product. Certainly every one agrees that medical curricula have been cluttered up with too much required time. There is no objection to cutting down the amount of required time provided the curriculum is so arranged that the students' free time is not boxed up so he cannot use it the way he ought to use it. If you give the student the right incentive and give him lots of free time, those who are really worth while are going to use it to advantage, probably, and I don't know whether we ought to worry about the others.

The question of the curriculum is one of our big problems. I think we can go slowly. Most of the schools have made great progress in the last thirty years. They have made it slowly and we should be careful not to undo what has been done.

I am located at Ithaca, with the other departments of the university all around me. I find my colleagues are confronted with the same kind of problems that we are. They do not seem to be any better satisfied with the way they are solving them than we are. If we were perfectly satisfied I should feel badly. As long as we are dissatisfied I think we have some chance of progress.

DR. DAVID L. EDSALL, Harvard University: May I tell you as briefly as I can a few things about our experience, because some people have questioned whether the student would use his time intelligently, I think perhaps all of us have earlier encouraged a feeling that the student was hardly to be trusted intelligently to employ his own time but we had to direct him in doing it.

Two years ago I mentioned the fact that we had very largely reorganized the course and had freed 25 or 30 per cent of the student's time which we had given to him to do with as he pleased. We have now had the complete experience of last year and we know what they are doing with their time this year.

The interesting side of it is that out of classes of 125, approximately 90 men have had clear ideas as to what they wanted to do with their time and practically did not require any help in deciding what they were doing with their time.

As to what they felt they wanted I was quite interested also. It is interesting that the outstanding thing that our students apparently feel they are not getting enough of is immunology. This throws some reflected light on the question whether they need more practical work or more theoretical work. Last year fifty-one men, the largest number that chose any one particular line of voluntary work, chose immunology. This year, with a new professor of immunology who is still more popular and still more able as a teacher, practically the whole second year class took voluntary work in immunology, and many of the third-year men have taken it again. There is always a considerable number that seek courses that are practically review courses. There should be that group. There is always a certain number of the class who merely want to be

helped along and get things better than they have before. By and large they choose with a very distinct independence, and with a clear idea as to what they want in the great majority of instances, and they say that they are enjoying it very much and that they are getting a great deal more out of it than when they were told definitely what they must do all the time. I cannot see that they are wasting their time in the least.

Another thing that interests me is this: For nearly ten years now we have had opportunity for the men to anticipate in the summer work that they might be doing the next year, and have given them the privilege of freeing time for additional elective work. They can employ that time as they see fit in additional elective work. That has largely increased. Last summer almost the whole class that were about to go into the fourth year did some work during the summer in order to free some time the following year. That is in spite of the fact that the number of men who are to some degree working their way through is about what it is in the rest of the schools. I looked that over only recently, and there are certainly forty to fifty per cent of the men in the school that are doing some work in order to get the necessary finances to get through the school. I think this shows a very admirable attitude of the students and shows that he is not loafing a bit, he doesn't want to loaf, he wants to get more really than he can crowd into the time; but he usually takes very intelligent advantage, I think, of special opportunities.

As I mentioned two years ago, in the fourth year with men who individually are approved of by the administrative board, we will allow as many as fifteen per cent of the class to take the whole fourth year concentrated in any one definite line that they want to take it in, that meaning only in the broad branches. We do not allow them to go into any of the so-called clinical specialties, but permit a broad type of work in general medicine or surgery or pediatrics or in the medical sciences. This year that work has been put under the general supervision of the tutors, tutors in the English sense essentially speaking, whose duties are to take care of these men who want to do rather exceptional things. That plan was established with the definite idea that it was not to be the top fifteen per cent of the class in marks. It was those men who had shown such qualities that it was believed they would profit by doing such work. They must also anticipate the requisite amount in summer in order to get the proper amount of medicine and surgery necessary by law. The men who wanted to do this were more than we felt could properly be taken care of at first.

In addition to that, we are trying only now another plan. I cannot report on what the effects may be, but I can report upon the response of the students. Not only is the general course too fixed and rigid in the number of hours that we have fixed, but in many ways the individual courses are too fixed, namely, the course is so filled with defined things that the teacher himself puts into the course that the student has relatively little opportunity to think broadly about any particular parts of the course.

This year, Dr. Redfield, who is one of the tutors and who is in the physiologic department, is trying this experiment: Instead of carrying them through a course in which a varied series of experiments in the laboratory fills up the whole schedule with a considerable group of different things, he has chosen a limited number of men to do a small number of laboratory observations illustrating typical phenomena in physiology, and then having this group of men spend the whole time available for laboratory work on these illustrative phenomena, in studying them and studying the literature in relation to them, in conferences with regard to them and their relation to other problems and other subjects, thus seeing how it will work out to have a more limited course as to elaboration of detail, but a more extended course as to thought upon the details that they do take up.

It is interesting that he wanted to take eight men to try it, and asked for volunteers, and seventy-five men volunteered. How that will actually work out I do not know, but I think it is an extremely interesting experiment and in my mind has the germs of perhaps altering the course within itself.

Dr. James F. McDonald, Creighton Medical College: I explained to Dr. Graves last night in considerable detail, our cooperative efforts at Creighton to solve some of the problems of medical education which are being so widely discussed nowadays. The outlines of our plan which I formulated and submitted to our faculty, is being worked out by a committee of three, Drs. Herbert F. Gerald, Victor E. Levine and James F. McDonald, with the cooperation of the Dean, Dr. Herman von W. Schulte, and the faculty. Believing that medical education is still preponderantly analytic and inadequately synthetic, our methods of reorganization are all based on cooperative principles. Three of these principles are suggested by the terms: sequence, content, and emphasis. Tables 1 and 2 represent the curricula of our freshman and sophomore years before and after reorganization, which shows what we have done by way of interdepartmental cooperation to embody these principles.

The extent to which we have incorporated sequence is well shown by comparing the arrangement of the curriculum of our second year before reorganization (Table 1) and after reorganization (Table 2). Each schedule is divided into as many vertical columns as there are subjects in the year. Each column, which is divided into 32 squares to represent the 32 weeks of the college year, is occupied by a topical outline of a subject. The place and duration of each topic in the different subjects is indicated by headings written in the appropriate squares. Thus, the outlines of all the subjects of the year, written in parallel columns side by side in each of the two schedules, are easy to compare.

Table 1, in which the different subjects are outlined as taught before the new plan, shows much confusion in sequence. A given biological system, say the excretory, is located in the schedule in the different subjects, as follows: In physiology, 26-27 weeks; in pathology, 24-25 weeks;

Sophomore Schedule I—(Old Schedule)

	PHYSIOLOGY	PATHOLOGY	PATH. PHYS.	APPL. ANAT.	PHYS. DIAG.	PHAR'COLOGY	SURGERY	BACTERIOL.
1	Muscle Nerve	Introduction	Metabolism	Scalp Cranium				
2	Muscle Nerve	Progressive Changes	Metabolism	Cranial Contents				
3	Muscle Nerve	Inflammation	Metabolism	Ear, Face				
4	Muscle Nerve	Inflammation & Animal Parasites	Metabolism	Orbital Region				
5	Muscle Nerve	Plant Parasites, Micro-organisms	Metabolism	Nose, Nasal Cavities				
6	C. N. S.	Infection Immunity & Infectious Diseases	Purin Metabolism	Mouth, Tongue, Pharynx				
7	C. N. S.	Infectious Diseases	Liver and Pancreas	Neck				
8	Heart	Infectious Diseases	Disturbed Kidney Function	Neck				
9	Heart	Infectious Diseases Malformations	Disturbed Kidney Function	Thorax				
10	Heart	Malformations Tumors	Disturbed Kidney Function	Thorax				
11	Circulation	Tumors	Disturbed Circulation	Abdomen				
12	Circulation	Tumors	Disturbed Circulation	Abdomen				
13	Circulation	Poisons, General Dia.	Disturbed Circulation	Pelvis				
14	Circulation	Violence Blood Form. Org. Blood	Disturbed Circulation	Pelvis				
15	Circulation	Lymph Nodes Spleen and Thymus	Disturbed Circulation	Upper Extremities				
16	Circulation	Review	Disturbed Respiration	Lower Extremities				
	PHYSIOLOGY	**PATHOLOGY**	**PATH. PHYS.**	**LAB. DIAG.**	**PHYS. DIAG.**	**PHAR'COLOGY**	**SURGERY**	**HYGIENE**
17	Blood and Lymph	Thyroid Adrenal Circulatory System	Disturbed Respiration	Haemocytology	Circulatory System	Narcotics, Methane, Alcohol, Ether, etc.	Head	
18	Blood and Lymph	Circulatory System	Digestion and Absorption	Haemocytology	Circulatory System	Hypnotics, Methane Ser. Chloral, Bromides	Head	
19	Respiration	Respiratory System	Digestion and Absorption	Haemocytology	Circulatory System	Narcotics, Opium Cannab. Ind.	Neck	
20	Respiration	Resp. System Digest. Syst.	Digestion and Absorption	Haemocytology	Circulatory System	Cerebral Stim. Nux Vomica Caffeine	Neck	
21	Respiration Digestion	Digestive System Digest. Syst. and Liver	Infection and Immunity Infection and Immunity	Gastric Analysis Gastric Analysis	Circulatory System Lungs and Pleura	Cereb. Stim. Parasym. Stim. Belladonna Stim. Cereb. & Parasym.	Trunk Trunk	
22	Digestion	Liver Urinary Org.	Infection and Immunity	Feces	Lungs and Pleura	Sympathetic Stim. Smooth Muscle Stim.	Male Genital Organs	
23	Digestion	Urinary Org.	Disturbed Heat Regulation	Feces	Lungs and Pleura	Cereb. & Ht. Mus. Stim. Digitalis	Female Genital Organs	
24	Absorption	Urinary Org. Reprod. Org of Female	Blood	Sputum	Abdomen	Card. & Smooth Muscle Depressants	Anus Perineum	
25		Reprod. Org of Female						
26	Excretion	Reprod. Org. of Female	Blood	Sputum	Abdomen	Protozoal Poisons	Upper Extremities	
27	Excretion	Reprod. Org. of Female	Blood	Throat Smears	Abdomen	Antipyretics, Antiseptics	Upper Extremities	
28	Sense Organs	Reprod. Org. Male. Mus. Bones, Jts.	Internal Secretion	Urethral Smears	Head, Neck Cran. Nerves	Coal Tar Ser. Antiseptics Phenol Group	Lower Extremities	
29	Sense Org.	Bones and Joints	Internal Secretion	Urinalysis	C. N. S. Reflexes	Iod. Phosph. Heavy Metals	Minor Surg. Technique	
30	Sense Org.	Nervous System	Central Nerv. Syst.	Urinalysis	C. N. S. Reflexes	Iron, Arsenic, etc.	Bandaging	
31	Int. Secr.	Nervous System	C. N. S.	Renal Funct. Blood Chem.	History Taking	Lead, Bismuth, Silver, etc.	Bandaging	
32	Review	Review	C. N. S.	Urea, Sugar Chlorides, etc.	History Taking	Ammonia Curare-like Drugs, etc.	Bandaging	

Table 1. Schedule of second year before revision by cooperative interdepartmental work to embody the principle of sequence.

Sophomore Schedule II—(New Schedule)

	PHYSIOLOGY	PATHOLOGY	PATH. PHYS.	APPL. ANAT.	PHYS. DIAG.	PHAR'COLOGY	SURGERY	BACTERIOL.
1	Muscle Nerve	Introduction Condrtions of Disease	Metabolism	Scalp Cranium				
2	Muscle Nerve	Regressive Changes Progressive Changes	Metabolism	Cranial Contents				
3	Muscle Nerve	Inflammation	Metabolism	Ear, Face				
4	Muscle Nerve	Inflammation Animal Parasites	Carbohydrate Metabolism	Orbital Region				
5	Muscle Nerve	Plant Parasit. & Dis.	Carbohydrate Metabolism	Nose, Nasal Cavities				
6	C.N.S.	Infection & Immunity Infec. Dis.	Purin Metabolism	Mouth Tongue, Pharynx				
7	C.N.S.	Infectious Diseases	Infection Immunity	Neck				
8	Heart	Infectious Diseases	Infection Immunity	Neck				
9	Heart	Infectious Diseases	Infection Immunity	Thorax				
10	Heart	Malformations Malformations and tumors	Central Nerv. Syst.	Thorax				
11	Circulation	Tumors	C. N. S.	Abdomen				
12	Circulation	Tumors	C. N. S.	Abdomen				
13	Circulation	Poisons Nervous Sys.	Disturbed Circulation	Pelvis				
14	Circulation	Nervous Sys.	Disturbed Circulation	Pelvis				
15	Circulation	Nervous Sys. Circulatory	Disturbed Circulation	Upper Extremities				
16	Blood Lymph	Circulatory	Disturbed Circulation	Lower Extremities				
	PHYSIOLOGY	PATHOLOGY	PATH. PHYS.	LAB. DIAG.	PHYS. DIAG.	PHAR'COLOGY	SURGERY	HYGIENE
17	Cerebral Spinal Fluid	Violence Blood Form. Organs	Disturbed Circulation	Haemocytology	Circulatory System	Narcotics, Methane Series	Technique	
18	Respiration	Lymph Nodes Spleen and Thymus	Blood Diseases	Haemocytology	Circulatory System	Narcotics, Methane Series	Upper Extremities	
19	Respiration	Vol. muscles Bones and Joints	Blood Diseases	Haemocytology	Circulatory System	Narcotics Opium Cannabis	Upper Extremities	
20	Respiration	Bones and Joints Respiratory System	Blood Diseases	Haemocytology	Circulatory System	Cereb. Stim. Nux Vomica Caffeine	Lower Extremities	
21	Digestion Absorption Secretion	Respiratory System	Disturbed Respiration	Sputum	Circulatory System	Cereb. Stim. Parasym., Belladonna	Head	
22	Digestion Absorption Secretion	Digestive System	Disturbed Respiration	Sputum	Lungs, Pleura,	Cereb. Stim. Loc. Anaes. Parasym. Stim.	Head	
23	Digestion Absorption Secretion	Digestive System	Disturbed Digestion and Absorption	Throat and Mouth Smears	Lungs and Pleura	Sympath. Term. Stim. Smooth Muscle Stim.	Neck	
24	Liver and Spleen	Digestive System Liver	Disturbed Digestion and Absorption	Urethral Smears, Exudates and Transudates	Lungs and Pleura	Cereb. & Ht. Muscle Stim. Digitalis	Neck	
25	Excretion	Liver Urinary Organs	Disturbed Digestion and Absorption	Gastro-intestinal	Abdomen	Card & Smooth Muscle, Depressants, Nitrites, etc.	Trunk	
26	Excretion	Urinary Organs	Disturbed Hepatic and Pancreatic Functions	Gastric Analysis	Abdomen	Protozoal Poisons, Ipecac Cinchona	Trunk	
27	Internal Secretion	Urinary Organs	Disturbed Kidney Function	Feces	Abdomen	Antipyretics & Antiseptics, Coal Tar Ser.	Male Genital Organs	
28	Sense Organs	General Dis. Thyroid and Adrenal	Disturbed Kidney Function	Feces	Head, Neck, Cranial N. S.	Antiseptics, Phenol, etc.	Female Genital Organs	
29	Sense Organs	General Dis. etc. Reprod. Org. of Femal	Disturbed Kidney Function	Urinalysis	C. N. S. Reflexes	Iodine and Heavy Metals	Anal Region	
30	Nutrition	Reprod. Org. of Female	Disturbances of Internal Secretion	Urinalysis	C. N. S. Reflexes	Heavy Metals, Arsenic, Iron, Antimony	Bandaging	
31	Metabolism Body Temp. Reproduction	Reprod. Org. of Male	Disturbances of Internal Secretion	Renal Func. Tests, Blood Chemistry	History Taking	Lead, Copper, Bismuth, etc.	Bandaging	
32	Growth Senescence Heredity	Review	Review	Blood	Review	Ammonia, etc.	Bandaging	

Table 2. Schedule of second year after revision by cooperative interdepartmental work to embody the principle of sequence. The sequence-zones show that the student, having begun the study of a biological system in the new schedule, continues it till completed in all the subjects of the year. Compare the resulting simplicity and order with the confusion in time relations of the old schedule in which the outlines were made by the individual instructors without cooperation. Bacteriology and Hygiene have not been mapped out in this schedule.

in pathological physiology, 8-10 weeks; in laboratory diagnosis, 29-31 weeks; in minor surgery, 23-24 weeks. Thus, the clinical and pathological aspects of this system are taken up before the student has studied its physiology. A line joining these topics zigzags widely over the schedule, weeks or months apart.

This malsequence is eliminated in the new schedule (Table 2). The same system, excretory, is here outlined as follows: Physiology, 25-26 weeks; pathology, 25-27 weeks; pathological physiology, 27-29 weeks; laboratory diagnosis, 29-31 weeks; physical diagnosis, 28 weeks; minor surgery, 27-28 weeks, inclusive. The student having begun the study of this system in physiology, continues its study synchronously, or in close sequence, until it is completed in all the subjects for the year. He also begins the study of this biological system in its more fundamental relations, and later takes it up in the applied subjects.

All the major systems, circulatory, digestive, hemal, respiratory, etc., show in the new schedule the same improvement in sequence, and exhibit much order and simplicity as compared with the old schedule where each department outlined independently the work of its own subject.

A detailed account of our work in reference to this principle of sequence is in process of publication.

Just as an adequate interdepartmental sequence requires cooperative interdepartmental effort, so also the sifting and selection of facts and principles which make up the content of the different courses, require the combined wisdom of all the different departments. No instructor in a fundamental subject is in a position, unaided, to assess all the needs of related departments in connection with the content of his own subject. This can only be done by the several departments working together. We are engaged now in the work of incorporating this basic cooperative principle also into our schedule. Just now we are focusing our efforts on the vascular system. This work involves the making of a detailed outline of each system by all the departments, and a reading of each outline by the instructors of other departments whose work is dependent on the subject thus outlined. This is done in committee, and casually also whenever any two professors have time to go over the outlines, and suggest to each other their mutual basic needs insofar as their subjects are interdependent. We have done much work along the lines of this principle of content in several other systems, as nervous, muscular, etc. We are not yet ready for a complete report of our work involving this and the following principle.

The principle of emphasis is related to that of content, and its incorporation into the schedule requires the same method of procedure by those responsible for its teaching. For the medical student, certain facts, principles and points of view are more important than others in each of the various subjects. Generally speaking, there should be a parallelism between the emphasis laid on the selected facts, principles, etc., and their importance to the medical student in his future work. Among the endless

accumulation of information found in the different subjects fundamental to clinical medicine, the student is lost trying to master it en masse without time or energy for comprehensive coordination. Material thus wisely selected and emphasized, forms a comprehensive basis for the interpretation of fundamental subjects, an adequate foundation for clinical diagnosis, treatment, prognosis and a foundation for keeping up with the growing advances in medicine.

In addition to organized interdepartmental cooperative work, individual teachers in our college are experimenting with other principles of coordination or synthesis. One of these principles is the use of clinical material in the laboratory. Thus, in physiology, after the usual study of a system, say the circulatory, by use of the various laboratory animals, we find it of much interest and help to present cases of circulatory syndromes. In trying to explain the phenomena of decompensation—dyspnea, edema, cyanosis, etc.,—in patients thus presented, the student arrives at a better understanding of the mechanism of normal and failing circulation. The analysis of cases of visceral and somatic neurological syndromes, by emphasizing the results of impaired functional systems, clarifies phases of normal physiology that are difficult or impossible to show by means of laboratory material and animals. By applying simple clinical methods as a test, for example, of the tract of Goll in a tabetic by moving a toe joint, or other joint of the lower extremity, and requiring the patient to tell the position of the part moved, the student gains a deeper insight into structural and functional relationships of the nervous system. In biological chemistry also, the student, as a result of a study and analysis of diabetic and nephritic bloods and urines, is enabled from the outset to grasp more clearly the principles underlying normal, as well as disturbed metabolism. Other principles of our plan, such as cooperation with clinical teachers by extension of fundamental subjects into the third and fourth years as a basis of interpretation of clinical phenomena, I shall not at this time discuss.

Dr. E. P. Lyon, University of Minnesota: Not having heard the paper, I am naturally prepared to discuss it to the best advantage! I probably have a few words, but they are down so deep I cannot get them out at this moment.

I am in favor of as much liberalism and individuality in education as can possibly be gotten. It is unfortunate that our medical education has to be in institutions with classes and artificial things of that sort. We all know that the human material is as variable as it can possibly be and that the ideal is free scope for all the individualities and capabilities that man possesses.

I can review very briefly what our present curriculum at Minnesota tends to do in this regard. In the sophomore year six hours per week are allowed for electives. These hours are not optional, they are required; but the students may take what they please. A variety of material is

offered to them. They distribute themselves with a good deal of variability, but with fairly adequate intelligence, I think.

In the first two quarters of the junior year there is the same amount of elective time. There is a large tendency to elect clinical subjects when the students reach the junior year, but a surprising number still select fundamental science, and this leads to quite a number of students doing advanced work in the fundamental departments, approaching research and in some cases real research. It puts quite a different spirit in the school from the stereotyped, fixed curriculum for all people. It puts a burden on the teachers, too.

Day before yesterday I was taking Dr. Myers around our school, and we went into the laboratory of Dr. Scott of my own department—supposed to be his private laboratory. Three students were working there. I said to him, "How many private students (that is what we call elective students) do you have working in here?" He said, "Seven; but fortunately they do not all work at the same time." You can see that these men must take a lot of Dr. Scott's attention and energy.

In the senior year, theoretically a very large amount of the work is elective. There is where a good many of our students, some 75 per cent, choose the student internship which I described at the Chicago meeting two or three years ago.

I can only say again that the more freedom and chance for individual scope the better, and my experience is that this opportunity for freedom will not be taken advantage of. The few who do take advantage of it suffer, it may be, but I am not even sure that that is true. Perhaps their judgment in the end may be as good as yours as to what they should study. Possibly the man that you think would have been better for having been driven along a fixed track is really better in the end by the experience which he has had in choosing his own by-ways, and it may be altogether fortunate. Think of Erlich, or Jacques Loeb and of many others, and hesitate to believe that all wisdom dwells in the Students' Work Committee or even in the Dean!

"KEEPING THE HOUSE IN ORDER"

H. G. WEISKOTTEN
Dean Syracuse University College of Medicine

When I assumed the acting deanship of our college two years ago I decided, as a means of familiarizing myself with conditions, to inventory the personnel and the curriculum of our school. The results of this inventory were so interesting and at the same time so confusing that I decided on various methods of checking the work during the year, and also determined to make the inventory an annual affair.

In a loose leaf book under each department is recorded certain information in regard to the teaching activities of the departmental staff, their status and their outside activities. Table I is a fictitious representation of such data as are usually recorded.

TABLE I.—DEPARTMENT OF PATHOLOGY

Name	Teaching Hours Did.	Lab.	Teaching Period	Salary	Status	Outside Work
Dr.....						
2nd Class.....	4	9	18½ wks.	$4,500	Full time	Some private diagnosis, about $500
2nd & 3rd Class	Autopsies					
Dr.....						
2nd Class.....	4	9	18½ wks.	$4,000	Full time	County autopsies, $2,000
4th Class.....	1	..	32 wks.			
2nd & 3rd Class	Autopsies					
Dr.....						
2nd Class.....	8	9	18½ wks.	$3,000	Full time	Path.....
2nd & 3rd Class	(Attends) Autopsies					Hosp. $1,000

Technicians: Mr....., $1,400; full time.
Miss....., $1,300; full time.

Total salaries.	$14,200
Equipment and supplies	950
Total budget.	$15,150

Actual total hours: 2nd yr. Conference and Laboratory.....342 hrs.
4th yr. Clinico-Pathologic Conference..... 32 hrs.

In addition, the inventory of the personnel included a personal interview with each member of the faculty responsible for any

of the teaching, either in the college or the dispensary or any of the hospitals. I fully realize that these are matters which probably should be handled by the heads of the various departments in the college. As a matter of fact, I was led to undertake these personal interviews, first, because the clinical professors seemed rather unfamiliar with conditions existing in hospitals other than the university hospital; and, second, because the professors themselves suggested that more detailed information might be secured in this way rather than in a departmental meeting.

The details of the work of the service are thoroughly discussed. The special interest or lack of interest on the part of the assistants, the possibilities of improving the service, either in the nature of new equipment, rearrangement of service, or changed personnel, are matters which have special interest and are of special importance to the school.

As a result of such interviews, mountains frequently melt away to mole hills, and there results a sympathetic understanding which is very helpful.

These interviews, of course, are confidential. Yet at the same time I have found that they are well worth recording for purposes of study. The dean here gains information which is of great value in improving conditions, especially in hospitals not entirely under the university control.

The result of this first inventory made apparent the need of accurate record of the supervision of the students in their clinical work and the actual time spent in the various clinics at the dispensary. Apparently simple registration of attendance gave insufficient information in regard to these matters. We now maintain in the dispensary and in all of the hospitals registration books which are in charge of a responsible clerk. Both faculty and students register on entering and leaving the hospital, and the record sheets are mailed to the college of medicine daily. At the office of the college of medicine the records are transferred to an ordinary class attendance book. Each service in each hospital has a separate page in such a book, and in addition to the length of time spent at the hospital the actual time covered by the teachers in each department is recorded.

February.....	4	5	6	7	8	9	
Dr.....	2	2	2	2½	2	2	
Dr.....	2	2	2	2	0	2	
Dr.....	2	1½	2	1½	2	1	
Time: 8 A. M.....							
9 A. M.....							
10 A. M.....							
11 A. M.....							

Table II represents such information as might be found in the official record book. This page represents a pediatric service, ... Hospital, the date, the names of the members of the faculty, and the number of hours which they spend at the hospital each day. Below that is a graphic representation of the amount of time during which the students are working under supervision. In this hospital the students are supposed to be present from 8 until 11:30 a. m., supposedly working under supervision. For instance, February 4, this would suggest that the entire time the students were in this department of the hospital they were under supervision. On the following day, February 5, they were only under supervision from 8:30 until 11 o'clock; on the 6th, from 8:30 until 11:30; on the 7th, from 9 to 11:30, and so on.

An instructor is not credited with any time recorded outside of the regular teaching hours, and these attendance record books give at a glance not only the amount of time spent at the hospital or dispensary, but the actual time during which the

students assigned to a special department were working under supervision.

These records are especially valuable in connection with the clinical work at the dispensary and give information in regard to actual time spent in any particular clinic. For example, for a number of years we have been crediting one clinic with two hours, four days a week. As a matter of fact, our records now show that the clinic seldom lasts longer than one hour. In other words, we have been "padding" our curriculum in this particular instance.

I am very frank to say that I have hesitated to cut down the number of hours in our curriculum in the clinical subjects until I had some reasonable idea of what I was cutting them down from and what I was cutting them down to. As a result of observations both at Syracuse and elsewhere, I have come to the conclusion that curriculum hours on paper do not often represent adequately supervised teaching hours. This is probably necessarily true because of the nature of the work and the varying conditions which may affect the schedule as outlined.

A SUGGESTION ON THE GRADING OF STUDENTS

THEODORE HOUGH
Dean University of Virginia Department of Medicine

I am contributing to this Round Table Conference, for any suggestive value it may have, a proposition now under consideration by the Medical Faculty of the University of Virginia regarding the method of determining the final grades of students in their several courses.

This proposition is an attempt to make the official grades represent more nearly than they do at present a student's originality and promise, and to introduce this element without introducing the personal equation of the subjective general opinion or impressions of instructors.

At least two considerations seemed to make this advisable. First, in the choice of a limited number of students to honorary societies like Alpha Omega Alpha, these qualities of originality and promise of future efficiency should have great weight; on the other hand, if subjective impressions in these matters are allowed to exclude men who would be entitled to election on the basis of their official records, there is grave danger of introducing into the election, social or other personal considerations which should be excluded.

Second, many hospitals, postgraduate schools, research foundations, etc., now call for the student's record as part of the evidence as to fitness for appointment. It is embarrassing to furnish a record with high grades and then have to supplement this with a statement that some one with a lower official scholarship record is a more promising candidate. These hospitals, etc., have a right to expect our official records to show the relative fitness of candidates from any one school and not merely relative ability to do routine classwork or to pass examinations.

I imagine that most instructors would gladly make both term tests and final examinations a test of originality and promise of future efficiency; but we know only too well that no antidote has yet been found, nor is any likely to be found, to the cramming

nuisance, the asininity of sacrificing sleep to this process at final examination periods, and nervous excitement in the examination room.

It is also urged that the ability to apply and use knowledge should, in every way possible, be impressed, throughout the course, on the student as the real objective rather than success in passing final examinations.

While our faculty would not consider favorably any attempt to impose on individual departments a uniform mechanical system of determining the final grades on courses, nevertheless, all are in full sympathy with the general end sought; and uniformity of general method in the attainment of this end by the various departments is not only desirable but also possible.

To do this it is proposed to calculate the final grade from the results of two kinds of tests,—those which give the results of daily work and final examinations and those which test more directly the student's ability to apply his knowledge—and to avoid having the results of the latter swallowed up by averaging with the former.

With these ends in view the following plan has been placed before the faculty for consideration in the form of preamble and resolutions. I submit these in the hope that they may be suggestive to others. It is needless to say that I would welcome any criticisms or suggestions, either at this Round Table Conference or in personal conversation later.

WHEREAS, It is desirable to make the final grades on each course represent not so much what the student is able to absorb and reproduce in written term or final examination as the ability to use acquired knowledge in the solution of problems, both in the scientific and in the clinical branches of medicine; and,

WHEREAS, It is not fair to make problem work an important feature of final examinations. Therefore, be it

Resolved: 1. That hereafter there shall be held in each course of the medical curriculum at least twice during each trimester an unannounced exercise to test the student's ability to use and apply what has previously been given in the course. These exercises are hereinafter termed application tests. Such exercises may be either written, oral or practical, or combinations of written, oral or practical, and should generally not exceed

one hour in length. The results of these examinations are to be graded on the scale of 1 plus, 1, 2, 3, 4 and 5.*

2. The average grades on these application tests are to be used as follows in determining the final record on the course:

(*a*) When the average of the application tests falls between 3 and 4, the final grade on the course must not be higher than 3, no matter what may be the average of term work and final examination.

(*b*) When the average falls between 2½ and 3, the final grade on the course must not be higher than 2.

(*c*) No final grade of 1 shall be given unless the average on application tests is 1 or higher, nor shall any final grade of 1 plus be given unless the average on application tests is 1 plus.

(*d*) No student receiving an average grade below 4 on the application tests shall receive a passing grade on the course. Such students shall, at the discretion of the instructor in charge, either receive a record of Failed, or shall be required to do additional assigned work and receive an average grade of at least 3 on at least three additional application tests; if they have also a grade of at least 3 on the combined term and final examination record, they may then receive a record of Passed (3) on the course.

(*e*) When the average grade on application tests is higher than 2.5, it may be averaged with the combined term and final examination grade. Fractions, however, shall not be used in reporting final grades; *e. g.*, 2.1 should be reported as 3.

3. Heads of departments, at their discretion, may use regular class work involving the ability to apply acquired knowledge (*e. g.*, the working up of a case by a clinical clerk), provided this does not violate the following requirements for any examination:

(*a*) The examination of all members of the same class should have approximately the same degree of difficulty.

(*b*) The work must be strictly individual work, with no consultation regarding it with anyone else.

4. In cases of courses which have less than three didactic exercises a week, application tests may be given for a combination of related courses; *e. g.*, urology may be combined with surgery or with orthopedics, dermatology with internal medicine, etc.

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*Roughly speaking, 1 corresponds to A, 2 to B, and 3 (the passing grade) to C; 4 entitles the student to one re-examination; 5 is a failure.

THE CASE OF THE POSTGRADUATE MEDICAL SCHOOL

WILLIAM DICK CUTTER
Dean New York Postgraduate Medical School

The training of a physician is a lifelong process. It cannot be completed in four years. We all know that sound judgment in diagnosis and in treatment comes only with maturity and large clinical experience. The supreme importance of self-education is easily overlooked, especially in these days of machine worship. Those whose names stand highest in our science and in kindred sciences have been for the most part self-taught. Simon Flexner received his medical training in a school which was one of the first to succumb in the campaign for proper standards in medical education. Benjamin Franklin was not a college graduate. Who taught Marion Sims to use a vaginal speculum? Or Chevarier Jackson, bronchoscopy? It is not my purpose to deny the value of formal instruction, but rather to point out that four years is all too short a time in which to teach the science and art of medicine, and that in our profession a man's usefulness in the world depends less on what he learned in the medical school than on what he does with himself afterward. The true function of the medical school is to teach the student habits of study and methods of examination, to familiarize him with the use of certain instruments, in order that when he begins to practice he may be able to learn from his experience and really begin to study medicine. All doctors may be classified in one or the other of two significant groups: (1) Those who, after graduation, continue to learn; and (2) those who proceed to forget.

However important self-education may be, and I consider it the most important single factor in the training of a physician, there are two or three reasons why we may not trust to self-education alone to carry on the work of medical training. Medicine is such a rapidly growing science that it is impossible for the practitioner in a small community to keep in touch with all

the advances that are being made. Especially is this true of certain diagnostic procedures necessitating the acquisition of a certain skill. And then there is specialization, the inevitable result of the increasing complexity of medicine, which calls for advanced instruction in limited fields. For these reasons there is a recognized need for graduate schools of medicine. The oldest institution of this kind in the country is the one I have the honor to represent, which for more than forty years has been trying to meet the demand for organized instruction in medicine on the part of men who have already received their degree and been licensed to practice.

Since postgraduate teaching is a continuation of, and supplemental to, the four-year undergraduate curriculum (it would be undiplomatic for me to suggest that it sometimes supplies the omissions or remedies the defects of the undergraduate school), ought there not to be a spirit of cooperation and mutual understanding between those who are charged with the responsibility for these two segments of the medical course? How else can the work of both be integrated? How else reach a common sense and practicable delimination of the boundary between these two phases of medical education? The increasing need and wider recognition of the value of graduate teaching are attested by the fact that many of the schools represented here have recently entered this field.

Inasmuch as heretofore no exclusively graduate school of medicine has ever made application for admission to membership in this association, the question is now presented to you whether you desire to include within the scope of your activities the training of those who wish to pursue their study beyond the required minimum of four years.

I have previously pointed out that many of you are already engaged in this kind of work. If you decline to assume this added responsibility, another association will inevitably be formed to represent the interests of the graduate schools. Is it desirable that another organization should enter this field and that the supervision of medical education be divided between two uncoordinated bodies? Does this association wish to put itself on record as having no further interest in the physician after he has obtained his diploma?

Having indicated the points of contact between graduate and undergraduate teaching in medicine, may I digress for a moment to bring before you some of the differences?

The most obvious, as well as the most fundamental, is that the graduate has his diploma, and usually his license, while the undergraduate has it not. For him the goal of his ambition, a professional career, the very means of earning a livelihood, all depend on his securing a degree. The faculty determines upon what conditions he may obtain a degree, and he has no choice but to comply with those conditions. He may like his professors or he may not; he may approve of their teaching methods or he may not; he may feel that he is learning a great deal, or he may feel that his time is being wasted. In any case, he must keep step with the procession and attend classes faithfully or he will lose his diploma and with it the chance of securing a license.

With the graduate the reverse is true. He has obtained his degree; he has his license. He may practice any and all branches of medicine without other restraint than his own conscience, without other limitation than the credulity or confidence of people among whom he lives. No law requires him to give his time to graduate study. No one can compel him to give up his practice in order to learn more than he already knows. If he does these things, he does them of his own free will, and at a very great sacrifice, a sacrifice which he will not make unless he is convinced that it is worth while. And even when matriculated in an institution, he is still free to discontinue his work or stay away from classes if they do not measure up to his standards, if they do not satisfy his wants.

As a result, the teacher in the post graduate school is continually on his mettle. If he fails to "deliver the goods" he soon has no class. He is compelled to strive incessantly to make his course more attractive, not by making it easy, like the "snap" courses in college, but by making it worth while.

Another feature in which the administration of the graduate school differs markedly from that of the undergraduate school is in the matter of entrance requirement. Most of the states have established a legal minimum of preliminary education without which no one may even enter the licensing examination. It is, of

course, a relatively simple thing for the schools to enforce this requirement. There is no way to get around the barrier which the state has set up.

Similarly, in respect to professional education, the various licensing boards have standards which must be met. But in post-graduate schools one is confronted first of all with the fact that the man already has his license. However much his previous training may suffer by comparison with accepted standards, he has received recognition from the community in which he lives, and may lawfully practice his profession. To refuse such a man opportunities for further study just because he has attended an inferior school would be the acme of stultification. The less his skill, the greater his need to improve himself. Surely, service to the community, which must be our larger aim, demands that we offer every opportunity and encouragement to the poorly trained man who desires to remedy the defects of his education.

I suppose that our school would be classified in what Dr. Cabot referred to as a quasi- or semi-educational institution because it is not a branch of a university, and there seems to be in some quarters a suspicion that institutions of that sort are conducted with a commercial end in view. It is true that our school, like a great many of those which you represent, was founded as a proprietary school in the sense that the members of the faculty, or some of them, owned the property of the school and administered its finances. So far as I know (and I know pretty well what the course has been for the last fifteen years at least) it never was the practice to declare dividends or "cut a melon," so that the faculty was not profiting in any direct sense from the operations of the school or the hospital. At any rate, at the present time and for the last fifteen years, nothing of that sort has occurred. The members of the faculty are not paid any salaries as such. Some of the instructors who give special or intensive courses requiring a good deal of time and attention are paid just exactly as part-time men who carry such courses would be paid in any of the other medical schools in the country. Very few of these men, however, receive compensation which is in any way significant. Some of the younger men who carry on courses in dissection or surgical anatomy, etc., and give three or

four mornings or three or four afternoons a week, do receive $1200 or $1500, but I am sure that compares very favorably with what would be paid for the same kind of service in any other school.

THE RESTRICTIONS OF DEMANDS IN CERTAIN SUBJECTS TO THOSE THINGS THAT ARE SIGNIFICANT*

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There is a widespread conviction among competent medical educators that the admirable progress that has been made in medical education and in the standards of license for practice has developed some features that need correction. This happens with almost all good things.

The rapid increasing of requirements, especially requirements of facts, readily tends to reach a point where the simple acquisition of facts absorbs much more of the student's time and mental effort than does the intelligent contemplation of these facts, the comprehension of the principles underlying them, or the competent use of them.

We have devoted our attention almost entirely to the increasing of requirements. With any subject in which knowledge is increasing extremely rapidly some of what was earlier accepted becomes recognized as erroneous, and is readily and naturally eliminated. But even though not erroneous, much earlier knowledge becomes unserviceable and of no significance. Custom and tradition are very likely to lead to the retention of this in the teaching long after it has ceased to be of value. The more rapidly knowledge increases, the greater the accumulation of the obsolete.

Medicine has shown in recent decades more fundamental, varied and rapid changes in knowledge and in viewpoint than has any other activity. The relative value of different divisions of our knowledge alters greatly, also, from time to time, and the daily activities of the practitioner of medicine are very different now from what they were a few decades ago. Were it possible to get into willing heads within a few years all available facts

*Read at the Congress on Medical Education, Licensure and Public Health, Chicago, March 3, 1924.

concerning the various branches which make up medicine, it might be desirable to do it, providing, however, there was a good comprehension of the significance of the facts and of the principles that bind them together. Unless the significance and principles were comprehended, such a mass of facts might readily be harmfully, rather than wisely, employed.

Not only, however, is such an acquisition of facts impossible. It is impossible to crowd in facts to a much less extreme point than this without obscuring the principles upon which they are based; and not the principles alone, but even important facts become dissolved in the large mass of the unimportant, and the crowding thus actually interferes with the development of competent knowledge. In his *Principia Therapeutics,* a very wise book dealing very charmingly with simply the principles of therapeutics, Harrington Sainsbury says in his preface:

> There are those who make light of general principles, knowledge of detail their sole demand; but this point of view sees one side only of the shield, be it silver or gold, as it shall please them. For, whilst doubtless general principles without details make but a foolish business, it is no less true that details without guiding principles yield but a busy foolishness.

I would not suggest that we are now generally engaged in a busy foolishness. In some particulars, however, I fear we approach it. I believe we have thought too exclusively of adding requirements, and of eliminating unfit students, and we should now give consideration from time to time to the elimination of unfit or unnecessary knowledge from our requirements, and that for the particular benefit of the students who are fit. There are some signs already that the lack of such elimination has had undesirable effects, and that these effects tend to fall most heavily upon the ablest and most independent-minded students. They affect the ablest most decidedly because, of course, the original and independent-minded student differs most from the common mould. When demands become set in such detail that in order to meet them within a given time effort must be devoted solely, or almost solely, to acquiring details prescribed by others; when, too, the time and the manner of acquiring them is prescribed in large degree, it is inevitable that most men soon become driven to conform to a common mould, to a common schedule, and a

common method of acquiring and looking at the same facts. The best students feel the effects of this most, and are more undesirably influenced by it than are the mediocre. This is true in medicine, as it is true in all forms of education.

It is undeniably true that the medical curriculum has become extremely rigid in this country. In order to accomplish what is demanded there has developed a very high degree of organization and sequence of the various courses, and all but a small portion of the time available is made use of for something definitely prescribed. Almost all subjects must be taken at exactly the same time, and in almost exactly the same way, by all students, and the amount introduced into each course is such that few students have time or energy to explore any subject in a spirit of independent interest. A little comparison shows that there is less intellectual freedom in the medical course than in almost any other form of professional education in this country. There is actually much less intellectual freedom than in the senior and junior years, at least, in any good college; less, indeed, than in each of the four years in many colleges.

The medical student has, therefore, peculiarly little opportunity for development of judgment as to the step that he will take next, peculiarly little responsibility in determining for himself what he will do and when he will do it. He knows that he can scarcely do much other than to keep to a lock step or he will be lost. Under such conditions, and with a severe task upon them, all but a very few do what is mapped out for them in the way that it is mapped out. Some do it better, some worse, but most of them without greatly exercising their individuality.

And yet these same men, as soon as they enter practice, will usually be called on to a singular degree, alone and without guidance, to assume responsibilities of the most serious character, and to make judgments upon the correctness of which human health or human life will often depend; whereas, those in other professions, trained with greater freedom, will usually serve in subordinate capacities for some time, and will usually have at first only minor responsibilities when they do act alone.

A prince of an Eastern royal family, a very intelligent young man, was recently a student at the Harvard Medical School. As he was about to leave, one of my colleagues asked him his impres-

sion of the work in the school. He replied, "It is an interesting compromise between an ideal and a practical necessity." Probably we must recognize that to be a reasonably complete description of what medical education must look to as its necessary objective. But practical necessities are not easy to establish even temporarily, and they change decidedly from time to time.

There are such great numbers of facts and conceptions with which the satisfactorily educated physician now must necessarily be familiar, that medical education cannot be made other than a severe training, and in considerable part a definitely prescribed training. There cannot be much time for idling, and we must exact high standards of accomplishment. But in the compromise that we have thus far made between ideals and necessity, have we not given chief consideration to the quantity of details to be acquired rather than to those qualities of knowledge, and that freedom in acquiring knowledge, that make for judgment and initiative?

Unless we consider carefully from time to time whether we cannot profitably reduce the demand in some matters that have less significance, the continuous large volume of increase that goes on makes medicine more liable than other subjects of study to reach a point where the product of the schools is actually less good than if less information, but a fuller and freer comprehension were demanded.

Some persons whose opportunities for such an opinion are good consider that the present day recent medical graduate has not the judgment, initiative, and self reliance in the employment of his knowledge that the graduate of a generation ago had. My own belief, after observing many recent graduates as internes and in practice, is that they rapidly make better doctors than the average graduate of a generation ago was at the same stage, but that even the better group of them, with individual exceptions, go through a period of dependence upon guidance, lack of initiative, and lack of confidence. These qualities may not be more marked than in earlier graduates. Concerning that very difficult comparison I am uncertain. But I am sure that their training is more thorough, and that when they come to be thrown upon their own responsibility, after a little period of confusion they rapidly demonstrate that their training is better. Granting, however, that

that is true, they should really have, clearly and from the first, more confidence, initiative, and independence than their predecessors instead of possibly less or even an equal amount; and it is peculiarly important that the doctor be possessed of these qualities.

There must, then, be some defect in the training, for the student body has better preliminary education, and certainly has equal intelligence—better intelligence, in fact, on the average, because the student body is now more carefully sifted. There are a number of things that go far, I believe, to explain this lack of adequate independence and judgment at the time of graduation. Much the most important in my belief is that the details required in the course have so multiplied that the student's time and thought are largely absorbed by his efforts to get what others have determined for him that he must have. He has little or no time or strength to exercise his own independent judgment, or to develop his interest or initiative, and the course is not so planned that it can be expected of him that he should develop these. Independent judgment and enthusiastic interest grow with exercise, and atrophy with disuse, as do most other mental as well as physical powers. I think the greatest fault in our medical training lies in not having given due consideration to that point. The methods now used in the clinical training in part of the last two years recognize this, and give much more opportunity for it than is true in the first two years, and much more than was the case in earlier years in the clinical training. But it is pretty slight still, even in the clinical years, and any freedom is confined almost entirely to a limited period of elective work and to the periods when serving as ward clerks. All these are but a small part of the whole time, and elective courses are very often pretty set in their character, and in such cases only give a man a little freedom of choice, but not much stimulus to his individuality and independence of action.

I feel with some confidence that many students when they get through the medical schools have less individuality, less enthusiasm, and less independence than when they entered from college. Some of this is a not undesirable loss of "freshness." Some of it, however, is a loss of a very precious kind of freshness that is most marked in the ablest and most original men. Often when

they are released from the mould they expand again into their own individualities. Some, I suspect, never do. Several of the most important professors of science in colleges have told me that they dislike to see their very ablest and most original students go into medicine, because they consider that the fixed and predetermined grind that they go through for four years tends to kill off their originality and enthusiasm for progress. I do not know how many feel that, but it gives me some disquiet that any competent man should feel it. The ablest of the young men are needed in medicine, and with their originality not merely unimpaired, but enhanced. I am, however, not pleading simply for greater attention to the men of exceptional minds, important as they are. If the germs of independence and initiative can be thus killed or stunted in those who have them in strongest form, they must be even more readily and definitely suppressed in the more common run in whom they are less marked, and in whom encouragement is needed to secure their growth.

The situation that I have discussed is not pronounced enough to justify alarm about it, but it is distinct enough to require an effort to change it. Much of the needed action can come from the medical school faculties alone. They can give the student more individual freedom in the direction and character of his effort, not only without reducing the standards of the schools, but with improvement in the character and quality of their graduates. They can give him some time free from scheduled directions, and not only allow him, but require him to employ it according to his best judgment. They can encourage him in developing a deeper insight into things in which he is most apt and most interested. They can rid themselves of some of the formulae and the machine-like organization and sequence that have in certain ways grown up to a degree that hampers individuality. Much of this they can do without needing cooperation from the members of your body, and some of it is in progress in certain places. But to do this most effectually, and to accomplish certain other results that are highly desirable, they will need cooperation from you and it is for that reason that I appear here.

Students must now meet, and will always be obliged to meet, some peculiar interests and fancies of their own teachers. They must, therefore, always learn some things, not because there is a

concensus of opinion that they are necessary, but because they appeal to their own instructors. These things are usually not many, and can be readily adjusted to. It is best that this should be so; otherwise things would become wholly stereotyped.

But with every increase in the number of examiners to whom they may be subject, the number of these things increases, and when we multiply the possibilities of these things by the number of States in the Union, the total that applicants for license become liable for is quite indefinite. Both the students and their instructors feel that in preparing for the various boards the only safety lies in accumulating the greatest mass of detail possible, significant or non-significant, for somewhere almost anything may be asked. Without your very generous and hearty cooperation it will be well nigh impossible to make progress in medical education in certain of the ways in which progress is most needed.

Were there any way of determining that certain things are of such significance and importance that they may be wisely demanded anywhere, and that certain things are not of such general significance and would not be demanded, both students and instructors could bend their efforts to the intelligent comprehension of the significant. Without some understanding of this kind there is no way of eliminating the large mass of the unnecessary that lumbers up and confuses the mind, and detracts from effective acquisition and employment of that which is important.

Just this idea has led to a considerable improvement in the teaching of one subject. The Council on Pharmacy and Chemistry met with cordial cooperation from many members of your body when they asked you to determine through the advice of a suitably representative group of clinicians which drugs were of such importance that applicants for license should know their uses, preparations, and doses, and which might be neglected in preparing for licensure. I was for a period previous to that time a professor of therapeutics and pharmacology, and I know from experience that students were obliged then by me and by others to learn about an interminable number of drugs, many of which were useless, some probably even harmful, some others relatively valueless, because they were still discussed in some standard text-books, had never been officially discarded, and were sometimes asked by State Boards of Examiners. If Oliver Wendell

Holmes was right in his judgment as to the proportion of drugs that could be dumped into the ocean without harm to any living creatures except the fishes, it would seem that even yet the fishes have distinctly the advantage of the humans. But there has been a real improvement, and the student may now concentrate more intelligently than before instead of having a confused and superficial complex of drugs in his mind, too diverse to be intelligently comprehended even by his instructors, and some of them so clearly valueless as actually to tend to undermine his faith in all.

To apply this same principle to other subjects is what I would propose to you, and in order to avoid too extensive an experiment, and to obviate confusion, I would suggest that it be done in only one subject at present, and that the one in which such action seems most desirable. Subsequently, the application of it to some other subjects may well be considered and carried out if meanwhile that proves desirable.

Let me first make it clear that I have no desire to plan a limitation of the teaching in any subject to what is obviously useful, directly and practically. I have no desire, that is, to make it simply utilitarian. The student needs to have a good elementary comprehension of the medical science as such, not simply bits of more or less detached information that might be employed from time to time as tools to open puzzles. I am heartily opposed to that, and wish, on the contrary, for an effect that while it would make knowledge more useful practically, would at the same time give better scientific comprehension of it. I have in view making it possible for such teachers as wish to do so to clear away safely and confidently such accumulation as was from the beginning, or as has become in the course of events, not only of little or no importance in itself, but also of no importance in illuminating the comprehension of important facts or principles. This material serves only to burden the memory and to confuse the understanding of more important things. Release from the need of spending effort on such material should result in a clearer and more effective comprehension of both the scientific and the practical significance of the subject, and would result in more interest in the subject. We readily fall into the error of believing that the accumulation of a large mass of information concerning the facts of a science is of itself a training in that science. It may when

carried far actually interfere with a real training in it; and with the desirable type of mind—the type that seeks principles rather than simply facts—the need of a great accumulation of the latter often arouses an actual distaste for the subject.

I would request, then, that you consider favorably the application of the plan to anatomy. In most places more time is given in anatomy to things that are retained in the course simply through tradition than is true of any other subject at present in the course.

The number of facts that properly should be acquired in anatomy is so large, and they furnish such a burden for the student, that often these alone unfortunately make him tend to accept the subject as a simple feat of memory, rather than as an intelligent study. When many data that are neither interesting nor important are added to these, the subject becomes to most students merely a memory task, to be gratefully relinquished, and often to be wholly, though unwisely, laid aside with rejoicing when they have crossed the Rubicon.

Furthermore, structure alone is relatively much less interesting to most minds than processes and functions. Anatomy necessarily deals mostly with structure, whereas other subjects deal mostly with processes or functions. The more largely structural facts are unnecessarily multiplied in anatomy, the less energy and spirit do most minds have for exploring the functions that these structures serve. Those departments of anatomy that bring out functional relations strongly are those that rouse the interest of their students most, and properly so. But there is the less opportunity for this, or spirit for it, when the number of facts required is extremely large.

It is obvious, also, that the stress should be laid in any subject upon those matters that illuminate and elevate the work that the student will perform in the world. Physiology, pathology, and practice of medicine are highly dependent on clear knowledge of the anatomy of the trunk and viscera. The significance to any of them of the anatomy of the extremities is relatively very slight. But the time and the effort put upon the latter is usually decidedly greater than that given to the former.

Ordinarily, also, the student is put through laborious study of much of the extremeties first, and reaches the viscera late,

although the latter naturally engage even nonmedical interest more, and are of first significance and importance to the medical man. The emphasis in his mind would be greater, and the interest aroused in him much increased, were the sequence different and were the weight as to time and effort laid upon the trunk and central nervous system, and much less detailed attention given to the head and neck and other extremeties, and to unimportant vascular and nerve branches and distribution in the body.

It would likewise prepare the student far better for his future studies and for his duties in practice. I have had many years of experience in the practice of internal medicine and pediatrics, and most of the activities of the usual doctor lie in these lines. I had also some years of essentially general practice. I feel quite sure that better training in the anatomy of the trunk and viscera and the central nervous system would have been very advantageous to me. I am equally sure that much of what I learned so laboriously about the extremeties, including the head and neck, and about the finer ramifications of vessels and nerves in the body, was neither directly useful nor illuminating, but was a pure burden soon discarded. I have discussed this with able and broad-minded general practitioners, and have thus far heard no dissent from that view.

It is clear, also, that the dominating purpose of the general medical course should be to train men as well as may be done for the general practice of medicine. Experts in special practice, teachers, and investigators are absolutely essential, but the place for giving them the special preparation that they need is naturally not the general medical course. That must come subsequently, and be specially arranged for by the smaller group that go into these particular activities. In no other way can either the fundamental training of the general physician or the adequate training of the specialist be properly done.

But as at present carried out, the training in anatomy is nearly everywhere in large part of more value to the surgeon or the neurologist than to the general physician, and not most suitable for the latter. There is, in fact, much remaining still that is obsolete even in surgery today, and that persists from the days before anesthesia and asepsis transformed the methods of surgery. In

some places this accumulation has been considerably, though not wholly, eliminated; in other places it persists much more extensively.

It is not uncommon to hear clinical teachers and practitioners and teachers of other medical sciences speak as if some alien viewpoint of our colleagues the anatomists were responsible for the persistence of this situation. In some instances that may be true, but certainly not as a general thing. I have usually found the anatomists with whom I have discussed the matter quite cognizant of the conditions, and some of them very desirous of being free to change them. But for the most part those who wish to do so feel unable to take really effective steps. They do not feel that they can safely concentrate more deeply on the essential features to any great extent or their students may, under present conditions, reflect apparent discredit upon their instruction when examined for license to practice. This fear is even more true of the students themselves. Anatomical friends who make efforts to eliminate what they consider only a confusing burden to the students tell me that it is difficult to get the students actually to eliminate. Their upper class confreres and those who have recently graduated have a deep conviction that all things must be known for the licensing boards. They pass this on to the younger students so effectually that most of the latter pore over even the fine print in their anatomical text-books. But the responsibility cannot be laid on the examining boards. I have sought the view of some conspicuous practitioners who have served with distinction on State Examining Boards, and they have heartily agreed with the picture of the situation as I have presented it, and have recognized its disadvantages.

It appears to be the result, not of unreasonableness on anyone's part, but of a custom that has grown out of, and continues because of, long established traditions. Anatomy was at first the only one of the medical sciences. In both the time and the detail given to it it then reigned supreme as the fundament of medicine. Also, it was from the beginning, and even to quite recent times, taught chiefly by surgeons, and as a stage toward the acquirement of a distinctive position in surgery. Anatomy, too, was always of obvious importance to surgery, while in medicine those developments in physical diagnosis and in pathology that have brought

out its most intimate relations and importance to medicine appeared long after the traditional methods of teaching anatomy became somewhat established.

Time has altered these influences somewhat, and in some places to quite a marked degree. But by and large the influences mentioned are still very conspicuous in much that remains.

Text-books in anatomy have helped to maintain this same tradition in that they have in no way helped to alter it. Authoritative text-books in anatomy are not really text-books for beginning students, or even those moderately advanced, but are really works of reference covering many of the needs of the specialist in practice and the advanced and special student of anatomy as well as those of the general physician. The student of general medicine cannot tell of himself what part of this vast whole he must have, what part he may leave aside. Only some agreement between his teachers and his examiners, put in such form that it can be made plain to him and can be depended upon, can act as a guide to him.

It would not be very difficult to reach such an understanding, and it would not be necessary to dictate in any way to individual anatomists. It would be necessary only to establish more definite limits to the field in which their students must be trained, while the individual anatomists would be wholly free to go beyond these in such ways as they and their faculties thought wise. This would give not less, but more freedom for those individual methods in teaching that it is so desirable should exist, and that have so much influence in improving teaching through the stimulus and competition that diverse methods of conspicuous men excite.

It would likewise in no way mean lowering the standards of your boards. Standards are of course far less a matter of quantity than of quality. Lessening the load of the unimportant would permit, rather, of stricter standards in those aspects of anatomical knowledge that are of peculiar importance to the physician.

I would request, therefore, that your body take action toward the consideration of this matter, and would suggest that if it should meet with favor from you it would be desirable to have a representative group, chosen perhaps by the Council on Medical Education and the Association of American Medical Colleges, determine the extent and character of the field of knowledge in

anatomy, histology and embryology, and the amount of actual dissection, that they feel would be, not only sufficient, but most effective for the general medical graduate; this group after due consideration to confer with representatives of your body and with the National Board of Medical Examiners, if that body should see fit to enter into the matter, with a view to establishing restrictions beyond which the examining boards will not require knowledge. The medical schools would, of course, be left free to go beyond and outside that field as they individually see fit, but would be held sharply responsible within that field. Your boards would expect, of course, no lowering of your standards, and not impossibly a sharpening of the quality of knowledge within that field and a broadened power of employing it in its physiologic, pathologic and clinical relations.

It would seem to me that the group might well comprise representatives of anatomy, physiology, pathology, clinical medicine, surgery, obstetrics and probably pediatrics, as these subjects are all in most important degree interested in an effective anatomical training, and are all of large importance to the general practitioner.

Beyond the sketchy indications that I have given you it is not at all my province to indicate the details of the direction in which such a group should work. In case you should carry out such a plan, the group will be better able than any individual to reach wise decisions about details.

THE ORGANIZATION AND EXPERIENCES OF THE SCHOOL OF HYGIENE AT UNIVERSITY OF PENNSYLVANIA*

ALEXANDER C. ABBOTT

Director School of Hygiene and Public Health

In November, 1923, I received from Dr. Fred C. Zapffe, secretary of the Association of American Medical Colleges, a letter in which he said, "Some of our colleagues are interested in the School of Hygiene and Public Health problems. Will you accept an assignment to relate at the Omaha or Chicago meeting, the experiences of your school at the University of Pennsylvania?" . . . I accepted the assignment, and that is why I am here now to address you on that subject. The points suggested by the secretary for discussion are: (1) Entrance requirements, (2) course of study and (3) graduate requirements.

1. ENTRANCE REQUIREMENTS.—This will depend on the courses of study that the student desires to pursue. If it is his desire to secure the degree Doctor of Public Hygiene, we require that he shall be a graduate of a Class A medical school, or shall have had a medical education or practical experience equivalent, in our judgment, to such preliminary education.

If he matriculates as a candidate for the Ph. D. in hygiene or cognate subjects, he must have fulfilled all the requirements of the Graduate School of the University before such candidacy is approved; *i. e.,* he shall already have been awarded the baccalaureate degree, and we insist that such degree shall have been given for approved work in the appropriate underlying sciences, particularly physics, biology and chemistry.

Candidates who are either not qualified for the degree Doctor of Public Hygiene, or who may desire a less elaborate systematic course of instruction, may, on the satisfactory completion of one year's work, be awarded the certificate designating

*Read at the Congress on Medical Education, Licensure and Public Health, Chicago, March 5, 1924.

the holder as "Certified Sanitarian." Candidates for this course of instruction may be either physicians, not graduates of Class A schools, or laymen qualified to profit by the work through having been awarded the baccalaureate degree in either science or civil engineering. In exceptional instances, individuals who do not come under either of these classifications are accepted because of their practical experience being in our judgment sufficient to enable them to profit by the instruction offered.

For special students—that is those taking work only upon particular phases of the subject, such as bacteriology in its various applications to sanitary problems, immunology, epidemiology, sanitary laboratory methods, protozoology or entomology in their bearings on public health problems, ventilation and heating, or particular phases of sanitary engineering, such as water supply and sewage disposal, etc.,—then our requirements are less rigid. We recommend that all such students be familiar with fundamental chemical, biologic and physical matters. Occasionally, however, students present themselves who are already employed in work bearing on one or another of the subjects enumerated, but who have had little preliminary education, and they have had little opportunity in which to get it. Often such students are thought well of by their employers, and desire to increase that appreciation by increasing their first-hand knowledge of the fundamental scientific phases of the subjects by intensive work in the appropriate laboratories. As such aspirations are to be encouraged, we refuse none who possess them, unless they are obviously hopeless. Also if, after a due trial, such a student shows himself incapable of profiting by work offered in our school, he is advised to withdraw as soon as his instructors are fully convinced of his incapacities.

2. Course of Study.—Though we have been engaged in this work for a reasonable length of time, we are not yet convinced that the group of studies required by us for the degree is the best. From time to time, we have modified it more or less, but we have kept constantly in mind that no group of subjects that does not fully acquaint the student with the ramifications of this many-sided problem can be satisfactory.

The group of studies now required by us for the degree

Doctor of Public Hygiene, and as set down in the latest bulletin of the school, comprises:

Sanitary engineering of buildings, water supplies and of sewage disposal.
Laboratory methods used in sanitary inspection—these are chemical, physical and biological.
Sanitary bacteriology and immunology.
Sanitary inspection of meat, milk and other animal products used for food.
Medical zoology, including particularly helminthology.
Entomology (the arthropods) and protozoology in so far as they relate to the transmissible diseases of man and animals.
Physical education, anthropometry and personal hygiene.
Industrial hygiene.
School medical inspection.
Social service—social and vital statistics.
Sanitary legislation.
General hygiene and epidemiology.
Practical field work, *i. e.*, the correct method of making sanitary surveys—critical visits to various establishments in one way or another related to the public health—such as water filtration plants, sewage disposal plants, garbage incinerators, public abattoirs, etc., etc.

3. GRADUATE REQUIREMENTS.—For the Doctor of Public Hygiene degree the university requires two years of study, one of which—the latter—must be in residence at the university. The candidate must also satisfy all the requirements of the several instructors who have participated in his training before the degree is awarded.

FEES.—The fee for the instruction leading to the Doctor's degree is $250 per annum. The same per annum fee is charged for the one-year course leading to the certificate.

For special students taking only particular courses of instruction, $35 is charged for each subject taken. There is a graduate fee of $20.

The foregoing about covers the points suggested by the secretary; but there is another feature of our particular school that may not be without interest, notably the manner of its organization.

Not being especially endowed for the purpose, the task which confronted us in our initial moves in this direction was that of so coordinating existing work of various departments of the

university that the important phases of the public health problem might be reasonably well covered. This plan is probably not the best, as I shall bring out later, but it was the only one open to us, as permission to organize the school was granted by the authorities only under the conditions that it added nothing to the annual expenses of the university.

The nucleus of the organization was obviously the laboratory of hygiene, in operation since 1892. As we conceived the organization at the time the work was begun, it was to include instruction in personal and domestic hygiene, epidemicology and such phases of engineering as to have to do with sanitation on the larger scale.

For instruction in personal and domestic hygiene, the two departments of physical education and the laboratory of hygiene soon so correlated this work that the field was fairly well covered.

For a comprehensive view of the field of epidemiology, we secured the cooperation of the department of biology, to the extent of offering special instruction for public health students in the field of entomology, in so far as it is related to the transmission of disease, the arthopods being given particular attention; and in protozoology in so far as it relates to protoza of animals and man. The department of pathology readily admitted our students to the courses in medical zoology and in the pathology of tropical diseases. The general subject of epidemiology, including applied bacteriology, was handled by the staff of the laboratory of hygiene. The veterinary school gladly arranged special instruction for our students on the diseases of domestic animals that are transmissible to man; and the proper control of the flesh and other animal products that are to be used for human consumption.

A reciprocal arrangement was reached between the School of Hygiene and the Towne Scientific School, whereby students of public hygiene are admitted to appropriate classes in the civil engineering department, and students of that department are admitted to the classes in bacteriology, in order that they may be familiar with those natural biologic activities on which the civil and sanitary engineer is so dependent for the success of many of his important undertakings.

The law school has joined with us in such discussion of the

legal aspects of health laws as we deem necessary, and competent instruction in the principles of statistics is given in the School of Finance and Economy.

We have also had—almost from the beginning—profitable cooperation between our school and the department of health, of both the city and the state.

Such, in brief, are the lines along which our school has evolved. I cite these steps to emphasize the point that practically all of our larger universities have in operation—if not all, certainly nearly all—the departments that we have, and that if it is desired to organize reasonably comprehensive instruction in public hygiene, it is possible to do so by the adoption of some such plan as that which we have followed.

The question that arises is, "Is that the best plan?" I do not think so. But in so far as we are concerned, it is the only plan. Were circumstances favorable, I would much prefer to see the work more centralized and less detached. I believe it would be of great advantage to have the main divisions of the subject develop in such close contact the one with the other, that an unmistakable atmosphere would be created, and that all other interests would be subordinate to those of the immediate problem of the public health. It is only under such an environment that a desirable spirit of investigation can develop. By our plan, it is obvious that we can look for little else than the routine teaching assigned to the several more or less detached departments. Their primary interests are in other directions.

Another question that may properly arise is that relating to the success of our school. In this connection I would say that, since 1906, when courses of instruction properly leading to a degree in hygiene were first offered, we have graduated forty doctors of public hygiene and four certified sanitarians, not to mention a respectable number of special students working upon particular phases of the general problem, and special instruction of an intensive character offered to the personnel of the municipal and state health departments.

It is proper to state here that since 1892, public hygiene, preventive medicine and epidemiology have been required subjects for all candidates for the degree Doctor of Medicine at the University of Pennsylvania.

In so far as I am aware at this time, our holders of diplomas and certificates are for the most part employed in work directly related to the public health, and, for the most part, they are making a reasonable success of it.

What is the future? With the best intentions, I cannot feel that for the nonendowed schools it is very bright, in so far as turning out large numbers of properly equipped professional sanitarians, health officers, administrators, etc., is concerned. The sum total for the whole country of those desiring such instruction and competently prepared to profit by it, is not large. The heavily endowed schools, of which we now have two, undoubtedly offer superior opportunities of various kinds that will attract the most desirable of that relatively small number. The balance will either enter into other fields of activity or will be enrolled by the less fortunate schools.

But the principal difficulty lies not in the greater or lesser excellence of this or that school, but rather in the fact that as at present affiliated, official public health work is in the main so associated politically as to be unattractive to many who could and would otherwise render excellent service to their respective communities. This condition is, however, undergoing a visible and rapid volution for the better, and in our progressive centers of population the departments of health, though still a part of the political machinery, are subject to far less annoyances, far less uncertainty of tenure of office, and are receiving far greater public support and respect than ever before. Opportunities offered by the Federal Public Health Service, and those afforded by the Rockefeller International Health Board, as well as some of our state organizations, may be cited as certainly not characterized by conspicuous political restrictions and petty annoyances.

But let us admit that organized official health work may never be divorced from politics, should this be sufficient to deter competent men and women from entering this field? If the results for which we are striving are to be obtained only through political activities, then it is obviously our duty to participate in these activities. There may be a difference of opinion on this subject but it is, nevertheless, my opinion that the sooner broad-gauge, educated and equipped men and women take active part in the

administration of the affairs of the country, the better it will be for all concerned.

But need these several conditions be sufficient grounds for discouragement? I do not think so. While the broad training of administrators and leaders is manifestly of the utmost importance, it is not by any means the only function open to those of us who are interested in the welfare of this far-reaching movement. If the nonattached practitioner of medicine is the most important auxiliary to organized official health work, as I believe him to be, then by so equipping the graduates from our medical schools that they possess an intelligent grasp of the objects and aims of organized health work, we will be contributing in a most effective way to the successful operation of the official organizations.

To those institutions possessing departments of medicine, I can offer no more important suggestion than that they delay no longer in insisting that their medical faculties provide specific instruction in the field of modern, preventive medicine—not as an elective subject,—not as an aside from the regular curriculum, but that instruction in preventive medicine in its broadest aspects be given as a required subject to each and every candidate for the Doctor of Medicine degree.

Furthermore, if appropriate instruction in approved preventive measures be included in the curricula of our nurses' training schools, we will still further add to the group of active auxiliaries. In this connection, I cannot advocate too strongly the organization of specific training in public health nursing. This can be done at every school in the country possessing a medical faculty and hospital equipment, and if done, will still further strengthen the contacts between the workers in this field and the laiety.

I do not feel discouraged; on the contrary, I am elated at the growing interest in this matter. It requires only coordination and cooperation of existing activities to create that essential viewpoint of prevention so admirably discussed by Zinsser at one of the recent meetings of this Association.

MEDICAL EDUCATION AND CULTURE*

STEPHEN RUSHMORE
Dean Tufts College Medical School

In a recent discussion of medical education there occurred the phrase "this culture business." It is a challenge in its implied scorn. It questions the intimacy of relationship between education and so-called culture and suggests that the more widely they are separated the better it is for medical education. As to real culture, that comes only from a scientific study of man and the world around him. In view of what William James called "the fluidity of the facts," it may be worth while to accept the challenge, or at least to think about accepting it.

What have men of science to do with culture, and what is curture to them? Not only of men of science, to whom the method of science is as the breath of their nostrils, but of doctors, teachers, is the question asked, what has culture to do with education?

No attempt will be made to give a new definition of culture, nor to catalogue what others have said about it, but the words of Whitehead are both apt and beautiful. In his presidential address to the British Mathematical Association on the "Aims of Education," he says "Culture is activity of thought and receptiveness to beauty and humane feeling."

Culture may be looked on from two points of view. It may be regarded as the endproduct, the result of endeavor; or it may be regarded as the process, which, in so far as process determines result, determines what is to be attained. It is to culture as a process that consideration will now be given.

In moments of depression, one may feel as if some of the present day methods of teaching are like feeding a dog. The dog is given a bone, in the form of a lecture to the student. If, later, the disfigured bone is recovered with some inconvenience and perhaps risk to the lecturer, he has in the examination paper a

*Read at the Congress on Medical Education and Licensure, Chicago, March 3, 1924.

scarcely recognizable fragment of what he intends to convey to the mind of the pupil.

But the mind of the pupil should be fertile. Ideas thrown into it should germinate, grow and bear fruit. The seed should fall on good ground, ground that has been well prepared. It is true that in a general scheme of education the rocky ground and shallow soil have to be considered. But by the end of two years of college work, the present minimum requirement for admission to the medical school, the processes of selection may be expected to eliminate most of the candidates who are naturally unfit. If these processes of selection are just, and they need careful revision from time to time, and the educational processes are adequate, the students who are admitted to the medical school may be regarded as the desired good ground.

At this point, a question may be raised. Is the seed good? Is there not much chaff? This is a serious problem which at some time will have to be given careful attention. If the seed is good, is it of the right kind? For example, there is confusion of purpose in the medical curriculum as it is now arranged. The teaching of anatomy furnishes an illustration. Formerly anatomy was taught chiefly by surgeons. Recently it has passed more and more into the hands of men whose major interest is in human and comparative anatomy, histology, embryology, and closely related branches of biology. As a result, the sciences have grown rapidly and cover a wide field in which the interest of the medical student is limited. At present the physician in training devotes time and attention to too much anatomy outside of what is needed in the practice of medicine; but already there is a movement to correct this misplaced emphasis.

Culture, then, may be regarded as the process which produces in the pupil, the student, a condition of fertility of mind, of richness of imagination, in so far as this is produced or affected by conditions external to the individual himself.

There is no question that fertility of mind is needed, not alone in medicine, but in every walk in life. Men of great, controlled, disciplined imagination are sought everywhere. Thomas Edison complains that he cannot get men of imagination in his business; and Henri Poincaré, in his discussion of the part that

hypothesis plays in science, has indicated the rôle of the imagination in the most majestic of sciences, mathematics.

What is the relation of culture to education? It is appropriate to use almost the exact words of John Henry Newman, who, after the manner of the Schoolmen, distinguishes between the integrity and the essence of the university, and reply that while the integrity of education consists in discipline, its very essence is culture.

How can medicine be taught culturally? In the best sense, it cannot be taught in any other way. If the human mind is brought in contact with things intellectual, it is nourished by them, it grows and bears fruit. It is this basic fact that determines the method. As President Gilman said, "Every study is liberal, if it is pursued in a liberal spirit."

Again the teaching of anatomy furnishes a convenient illustration, for it is acknowledged to be fundamental and the principles involved are identical for all the sciences.

How can anatomy be taught culturally, so that it shall be to the student a source of inspiration, of power; as Keyser has so well put it, wooing his loyalty, revealing to him the guardian angel of science, that ideal of excellence, with the abiding sense of the authority of its standards?

In the first place, anatomy should be taught as it is. But what is it? It is a living, growing science, with a history, an evolution not yet completed; with a past, a present, and a future; comprising problems that have been solved, problems now in solution, problems that await solution, perhaps only at some distant day.

Too much is attention directed to text-books of which Minot said, "When knowledge is dead we bury it gently in a book"; and to mechanisms which, worn out and exhausted, would be thrown away if it were not for the dissecting room. And, of course, investigation is necessary. Anatomy can best be taught as a living, growing branch of knowledge by one under whose hands it grows.

In addition to this evolutionary or historic point of view, there is the biographic point of view. The problems of anatomy are problems to persons. The stories of the lives of the men who formulated, attacked and solved the problems are among

the stimulating influences of our lives. They open vistas to the eyes of the student.

John Hunter is an example; anatomist, physiologist, pathologist, surgeon, and, above all, experimental biologist. "Don't think; try," was his dictum. It might well be said all living things were his province. At a time when he was struggling against the disease which later proved fatal, in a letter to a friend in Africa asking for many things, he wrote: "If a Foall Camell was put in a tub of spirits and sent, I should be glad. Is it possible to get a young tame lion, or, indeed, any other beast or bird?" Or, indeed, any other beast or bird! How can one read the story of Hunter's life and not be uplifted by the picture of his marvelous and vehement energy?

The third point involves a paradox. It is that if anatomy is to be studied culturally, it cannot be studied by itself. For culture implies interpretation, and significance, and values; relation to other things and to other branches of knowledge. In the medical curriculum, this means at least correlation of courses; the relation of anatomy to physiology and to pathology and to clinical medicine; the relation of structure to function, whether in the gross or in the ultra-microscopical molecule or atom. But it is not enough to concede that correlation is advantageous. Correlation is more than advantageous; it is vital in teaching.

Professor Whitehead put the whole matter briefly. He said, "Theoretical ideas should always find important applications within the pupil's curriculum. This is not an easy doctrine to apply, but a very hard one. It contains within itself the problem of keeping knowledge alive, of preventing it from becoming inert, which is the central problem of all education."

MINUTES OF THE PROCEEDINGS OF THE THIRTY-FOURTH ANNUAL MEETING OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES, HELD IN OMAHA, NEBRASKA, FEBRUARY 28-29 AND MARCH 1, 1924

FIRST DAY

Morning Session

The delegates to the thirty-fourth annual meeting of the Association of American Medical Colleges assembled in Conkling Hall on the medical campus of the University of Nebraska, and were called to order by the president, Dr. Irving S. Cutter, at 9:30 o'clock.

PROGRAM

The first paper on the program was read by Dr. Don R. Joseph, St. Louis University School of Medicine. It was entitled "An Experiment in Interdepartmental Correlation."

Dr. O. H. Perry Pepper, University of Pennsylvania School of Medicine, followed with a paper entitled "Experiences with Medical Clinics to the First Year Classes."

These two papers were discussed by Drs. C. P. Emerson, William Darrach, William Keiller, David L. Edsall, Stewart R. Roberts, L. D. Moorhead, G. Canby Robinson, J. Parsons Schaeffer and, in closing, by Drs. Joseph and Pepper.

Dr. Walter L. Bierring, National Board of Medical Examiners, read a paper on "Teaching of Pharmacology."

It was discussed by Drs. Hugh A. McGuigan, C. F. Martin, C. C. Guthrie and W. L. Bierring, in closing.

Dr. Walter L. Niles, Cornell University Medical College, read a paper entitled "The Poor Boy in Medicine."

This paper was discussed by Drs. Theodore Hough, Irving S. Cutter, Frederick T. Van Beuren, Jr., E. P. Lyon, W. H. MacCraken and Dr. Niles, in closing.

Adjourned.

Afternoon Session

The first paper read at the afternoon session was the address of the president, Dr. Irving S. Cutter, University of Nebraska College of Medicine, entitled "Basic Principles of Clinical Teaching."

Dr. Burton D. Myers, Indiana University School of Medicine, followed with a paper entitled "A Provision for Increase in Medical School Enrollment Without Increase in Physical Equipment."

This paper was discussed by Drs. Hugh Cabot, William Pepper, E. P. Lyon, Ross V. Patterson and Dr. Myers, in closing.

Dr. L. S. Schmitt, University of California Medical School, read a paper entitled "Again, the Fifth or Intern Year; a Retrospect."

The discussion on this paper was participated in by Drs. E. S. Dickson, William Darrach, W. H. MacCraken, William Pepper, Ross V. Patterson, Walter L. Bierring, David L. Edsall, A. C. Abbott, N. P. Colwell, Stewart R. Roberts, C. A. Hamann, C. C. Guthrie, and, in closing, Dr. Schmitt.

Mr. Samuel P. Capen, University of Buffalo, read a paper entitled "The Determination of Content of Professional and Pre-Professional Training."

This paper was discussed by Drs. Frank P. Trotter, S. P. Brooks, C. H. Avery, Henry Page, George M. Kober, J. Parsons Schaeffer, Carl J. Wiggers and Mr. Capen, in closing.

In the absence of Dr. Roy Lyman Wilbur, chairman of the Committee on Education and Pedagogics, the report of the committee was read by Dr. A. S. Begg.

SECOND DAY

Morning Session

This session was devoted to practical demonstrations in medical teaching in the medical schools of the University of Nebraska and Creighton University. The delegates visited such classes as they desired, either in the laboratories or in the hospitals, and witnessed the conduct of the regularly scheduled classes, ward walks or clinics.

Afternoon Session

This session was devoted to a Round Table Conference, at which subjects of especial interest to the deans were presented.

The first topic presented was "The Intern Problem," by Dr. Nathaniel W. Faxon, chairman of the intern committee of the American Hospital Association. The discussion was continued by Drs. Fred C. Zapffe, William Darrach, C. C. Bass, Roy Lyman Wilbur, C. Sumner Jones, Ross V. Patterson, J. M. H. Rowland, C. F. Martin, William Keiller and, in closing, by Dr. Faxon.

The next topic was "The New Medical Curriculum," presented by Dr. Stuart Graves, University of Louisville School of Medicine. The discussion continued by Drs. C. A. Hamann, Hugh Cabot, Abram T. Kerr, David L. Edsall, E. P. Lyon and J. F. McDonald.

The following subjects were also presented: "Keeping the House in Order," by Dr. H. G. Weiskotten, Syracuse University College of Medicine.

"The Case of the Postgraduate Medical School," by Dr. William Dick Cutter, New York Postgraduate Medical School.

"Grading Students on Their Work," by Dr. Theodore Hough, University of Virginia Department of Medicine.

Adjourned.

THIRD DAY

Executive Session

The delegates convened in executive session at 9:30 a. m. with the president, Dr. Cutter, in the chair.

ROLL CALL

The roll call showed that the following colleges were represented:

Stanford University School of Medicine—E. S. Dickson.
University of California Medical School—L. S. Schmitt.
McGill University Faculty of Medicine—C. F. Martin.
University of Colorado School of Medicine—C. N. Meader.
George Washington University Medical School—William C. Borden.
Georgetown University Medical School—George M. Kober.
Howard University School of Medicine—Paul Bartsch.
Emory University School of Medicine—Stewart R. Roberts.
Loyola University School of Medicine—L. D. Moorhead.
University of Illinois College of Medicine—Hugh McGuigan.
Indiana University School of Medicine—Charles P. Emerson.
State University of Iowa College of Medicine—John T. McClintock.
University of Kansas School of Medicine—G. E. Coghill.
University of Louisville Medical Department—Stuart Graves.
Tulane University of Louisiana School of Medicine—C. C. Bass.
Johns Hopkins University Medical Department—G. Canby Robinson.
University of Maryland School of Medicine and College of Physicians and Surgeons—J. M. H. Rowland.
Boston University School of Medicine—A. S. Begg.
Medical School of Harvard University—David L. Edsall.
Tufts College Medical School—Stephen Rushmore.
Detroit College of Medicine and Surgery—W. H. MacCraken.
University of Michigan Medical School—Hugh Cabot.
University of Minnesota Medical School—E. P. Lyon.
St. Louis University School of Medicine—Don R. Joseph.
University of Missouri School of Medicine—Guy L. Noyes.
John A. Creighton Medical College—H. von W. Schulte.
University of Nebraska College of Medicine—Irving S. Cutter.
Albany Medical College—Thomas Ordway.
Columbia University College of Physicians and Surgeons—Wm. Darrach.
Cornell University Medical College, Ithaca and New York—Walter L. Niles.
Long Island College Hospital—Adam M. Miller.
Syracuse University College of Medicine—H. G. Weiskotten.
University of Buffalo Department of Medicine—C. Sumner Jones.
Wake Forest College School of Medicine—Thurman D. Kitchin.
University of North Dakota School of Medicine—H. E. French.
Ohio State University College of Medicine—E. F. McCampbell.
University of Cincinnati College of Medicine—Henry Page..
Western Reserve University School of Medicine—C. A. Hamann.
Hahnemann Medical College—W. A. Pearson.
Jefferson Medical College—Ross V. Patterson.
University of Pennsylvania School of Medicine—William Pepper.
University of Pittsburgh School of Medicine—R. R. Huggins.
Woman's Medical College of Pennsylvania—Martha Tracy.
Medical College of the State of South Carolina—Robert Wilson, Jr.
University of South Dakota College of Medicine—C. P. Lommen.

Meharry Medical College—J. J. Mullowney.
Vanderbilt University Medical Department—G. Canby Robinson.
Baylor University College of Medicine—W. H. Moursund.
University of Texas Department of Medicine—William Keiller.
University of Vermont College of Medicine—H. C. Tinkham.
Medical College of Virginia—Manfred Call.
University of Virginia Department of Medicine—Theodore Hough.
West Virginia University School of Medicine—J. N. Simpson.
Marquette University School of Medicine—Louis F. Jermain.
University of Wisconsin Medical School—C. R. Bardeen.

OTHERS PRESENT

The following delegates and visitors were also present:

RAY LYMAN WILBUR, president Stanford University; DAVID KINLEY, president University of Illinois; SAMUEL P. CAPEN, chancellor University of Buffalo; FRANK B. TROTTER, president University of West Virginia; S. AVERY, chancellor University of Nebraska; S. P. BROOKS, president Baylor University; N. P. COLWELL, Council on Medical Education and Hospitals of the American Medical Association; WALTER L. BIERRING and EVERETT S. ELWOOD, National Board of Medical Examiners; HAROLD RYPINS, University of the State of New York; F. W. O'CONNOR, Rockefeller Foundation; H. E. ROBERTSON, Mayo Foundation; NATHANIEL W. FAXON, University of Rochester, chairman Intern Committee American Hospital Association; R. O. PORTER, University of Utah; J. C. SIMPSON, McGill University; NEWTON EVANS, College of Medical Evangelists; PAUL S. MCKIBBEN, University of Western Ontario; S. WILLIS PROWSE, E. W. MONTGOMERY and JASPER HALPENNY, University of Manitoba; WILLIAM D. CUTTER, New York Postgraduate Medical School; P. J. MAHAN, Loyola University; S. J. MCCORMICK and W. F. WHELAN, Creighton University; C. C. GUTHRIE, University of Pittsburgh; ALEXANDER C. ABBOTT and O. H. PERRY PEPPER, University of Pennsylvania; FREDERICK T. VAN BEUREN, Jr., Columbia University; WILLIAM ELSER and ABRAM T. KERR, Cornell University; J. PARSONS SCHAEFFER, Jefferson Medical College; BURTON D. MYERS, Indiana University; CARL J. WIGGERS, Western Reserve University; HOWARD B. LEWIS, University of Michigan; E. H. CARY, Baylor University; B. F. MCGRATH, Marquette University; ROY F. CRUMMER, JOHN S. LATTA, C. H. WATERS, J. JAY KEEGAN, CHARLES O. RICH, F. W. HEAGEY, M. BEBER, FRANKLIN D. BARKER, G. A. TALBERT, C. W. M. POYNTER, W. A. WILLARD and F. J. MURRAY, University of Nebraska.

MINUTES OF PREVIOUS MEETING

The minutes of the 1923 meeting of the Association were called for. The secretary stated that unless it was the wish of the delegates assembled that these minutes be read, he would offer, as having been read, the minutes as published in the transactions, pages 156 to 173.

On motion, duly seconded, the minutes as printed and corrected were approved.

REPORT OF SECRETARY-TREASURER

The report of the secretary-treasurer was called for, and the following was submitted:

The past year was an eventful one in the history of the Association of American Medical Colleges. The 1923 meeting, held at Ann Arbor, Michigan, marked a return to the custom of holding meetings in cities in which medical colleges are located. The success of that meeting fully justified the wisdom of this plan. The place held by this Association in medical education demands that careful deliberation and full discussion be given to such problems as properly should come before the Association. Hence more time for meeting is essential. This cannot be had when the meeting is held at the time of a three to five days' Congress, concerned mainly with problems of licensure, hospital standards and questions of public health. Furthermore, this is the only organization vitally concerned and interested in medical teaching. Here, and here only, can medical teaching be discussed—not only in its theoretical, but in its practical phases.

Since 1907 papers on medical teaching have had a place on the program—and each year since then these papers have been of increasing worth and value. The notable contributions of various committees on pedagogy, especially at the 1909, 1910, 1920 and 1921 meetings, have been milestones in progress in this field.

Not until this year has any attempt been made—wholly because of lack of time—to present this essential subject in a practical way. One entire session will be devoted to practical teaching demonstrations when visiting medical teachers will be given an opportunity to witness the teaching methods in virtually all subjects of the medical curriculum by the faculties of the College of Medicine of the University of Nebraska and the Creighton University Medical College.

Another feature introduced at the 1923 meeting was the Round Table Conference. Here were discussed in an informal manner the problems of interest to every executive and administrative officer. The plan met with favor and will be continued at this meeting. Nowhere than here can the intern problem and the new curriculum be discussed to such good advantage. The men who are directly concerned in the practical working out of these questions are here and ready to express their views, if given an opportunity. This opportunity is offered. All discussions are informal. Subjects not listed in the program may be presented for discussion, notice thereof being given in writing to the secretary.

A survey of the general index of the publications of this Association since its organization in 1891, that was a part of the volume of transactions of the 1923 meeting, bears witness to the valuable contributions the Association has made to medical education. Virtually all progress made in medical education has had its inception in the councils of this Association. Leaders in medical teaching and practice have been exceedingly active in the conduct of its affairs. The roster of officers and members of important committees is a notable one. Sir William Osler, N. S. Davis,

W. L. Rodman, J. M. Bodine, Leartus Conner and many others equally well known, deceased and living, have guided the destinies of this Association. The history of the Association is replete with the advances in medical teaching proposed and inaugurated by its efforts. The Association of American Medical Colleges may well be proud of its achievements. I believe that it may be asserted, without fear of contradiction, that the now very complete record of medical students on file in the office of the Council on Medical Education and Hospitals of the American Medical Association had its inception in the matriculation record blank instituted by this Association in 1905 and discontinued when the more elaborate system of the Council became fully operative.

Mention is made of this one fact because one college suggested last year that this Association take on this work now—evidently not having knowledge of previous efforts in that direction.

The work of this office during 1923 has been greater than ever. Correspondence has greatly increased in volume. The preparation of the General Index was no small task. The officers of the Association felt the need of keeping in closer touch with the colleges and their individual problems. Much work was done and much has been accomplished; more remains to be done. Every one's help is needed. It is not any one man's job. Everybody must give aid.

Copies of the 1923 transactions and the new constitution and by-laws were distributed freely and widely so as to give greater publicity for the efforts made by this Association to make medical teaching better and more effective.

The resolutions on teaching hygiene in colleges and on federal health adopted at the 1923 meeting were delivered to Dr. F. A. Storey and Dr. Arthur T. McCormack, respectively.

Connection was established with the American Hospital Association on the intern problem. A report of the progress made will be read later. Dr. Nathaniel W. Faxon, chairman of the Intern Committee of the American Hospital Association, is present at this meeting and will speak on this topic later.

Cooperation with licensing bodies is being continued more actively. Representatives of the Federation of State Medical Boards and of the National Board of Medical Examiners are present and will take an active part in the proceedings. The Rockefeller Foundation is also represented.

Application for membership has been received from the Faculty of Medicine of McGill University and from the New York Postgraduate Medical School.

Meharry Medical College has applied for restoration to full membership.

Inspections of colleges in membership have been made and reports presented to the Executive Council. The colleges inspected were: University of Colorado School of Medicine, Creighton University Medical College,

University of Buffalo, Syracuse University College of Medicine, Cornell University at Ithaca, Indiana University School of Medicine and University of Vermont School of Medicine.

The great need of a closer and more effective means of communication between this office and the membership of the Association is each year becoming more apparent and its lack more felt. It might be well to revive the one-time Bulletin—if the problem of financing can be solved. Perhaps, if the existence of this need were shown effectively, one or both of the great medical foundations would come to the rescue. The secretary is working on this plan and hopes to be able to report favorably on it in the near future.

The membership should be imbued with the thought that the secretary is willing and ready to give such aid as he can at any and all times. You are urged to communicate with him on any problems that arise, with the assurance that help can and will be given. Much of that sort of thing has been done during the past year on which it is not necessary to report —except to state that it has brought colleges into closer touch with the Association and its work and cemented the entente cordiale, which is most to be desired.

The financial statement shows a cash balance of $2,333.41.

Respectfully submitted,

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

On motion, duly seconded, the report was received and accepted, except the portion dealing with the finances, which was to be referred to an auditing committee for audit and report.

The Chair appointed on this committee Drs. L. S. Schmitt, G. Canby Robinson and E. F. McCampbell.

REPORT OF EXECUTIVE COUNCIL

The report of the Executive Council was then called for and was submitted by the chairman of the Council, Dr. John McClintock.

REPORT OF THE EXECUTIVE COUNCIL

I. The Council received the formal application of the McGill University of Montreal for active membership in this Association. The Secretary of the Association having formally visited McGill University and his report to the Council being entirely favorable to McGill University, the Council voted to recommend that the Faculty of Medicine of the McGill University be accepted into full membership of the Association.

II. At the meeting of the Association held last year at Ann Arbor the Council was instructed to undertake the problem of securing some uniformity in the time of holding examinations for internships and making appointments of interns, such time as would least interfere with the regular instruction of students.

Dean Darrach of Columbia University sent a form letter to the various colleges of the Association and received from practically all an approval of the establishment of a uniform time of examination and appointment of interns. This matter was also presented to the Internship Committee of the American Hospital Association prior to its meeting at Milwaukee and the Committee in their report to the Association recommended the cooperation of the College Association in attempting to secure some uniform time for examination. Through the efforts of the Deans of the Medical Colleges located in New York a meeting was held in New York representing the hospitals and medical colleges of New York, Philadelphia, Baltimore and Boston. An effort was made to formulate some plan of uniformity but without definite results.

So far the results of these efforts seem largely to be a development of greater willingness for cooperation than has existed heretofore and that, while as yet no concrete plan can be adopted there is evidence that some such plan can be formulated. The Executive Council, therefore, has no definite plan to suggest to the Association other than that the Council continue its efforts with the Hospital Association to secure some definite time of examination and appointment of interns.

The Council further recommends the adoption of the following resolution:

It is the wish of this Association that appointments for hospital internships be deferred until after the fifteenth of March each year and that the members of this Association be requested to make every effort to have this time set for the appointment of interns in their respective localities.

III. Because of the interest which has been taken in the development of a fifth year or internship requirement for graduates and the possibility of a larger number of colleges accepting the requirement, the Executive Council has deemed it wise to express its opinion on the academic status, and has adopted the following resolution: That while we recognize that the colleges may feel justified in deferring the conferring of the degree for one year after the completion of the academic work leading to the degree of Doctor of Medicine, nevertheless, it cannot consider the work of that year as work for which a college is responsible if done in a hospital over which the college does not have full control of the interns.

IV. An application from the New York Post-Graduate Medical School was received by the Council. As the present Constitution does not provide for membership in the Association except of undergraduate schools, it was impossible to act on this application at this time. However, the Council feels that this Association should take an interest in and should make an effort to encourage and assist in the effort to provide proper postgraduate courses in medicine and therefore, wishes to announce that in accordance with the requirements of the Constitution, written notice will be sent to the members of the Association of the revision of the

Constitution to provide for the membership of graduate schools in medicine which are parts of universities, graduate divisions of universities offering medical instruction, and schools offering courses in medicine to general practitioners but not leading to any degree.

The Executive Council recommends that the Constitution be revised as follows:

ARTICLE III: Section 2 to read as follows:

Any graduate school in medicine, a part of a university, any graduate division of a university offering medical instruction, or any school offering courses in medicine to general practitioners but not leading to any degree, is eligible to graduate membership in the Association on conforming to such requirements as the Association may adopt.

ARTICLE III. Section 3 to read as the present Section 2.

ARTICLE III. Section 4 to read as the present Section 3, except for the insertion of the word "active" before "membership" in the first line.

ARTICLE III. Section 5 to read as the present Section 4.

ARTICLE V. Section 2 to be amended by substituting a comma in place of the word "and" between "honorary" and "associate" and the insertion of the words "and graduate" between the words "honorary members."

(Signed) C. P. EMERSON
DAVID L. EDSALL
G. CANBY ROBINSON
WALTER L. NILES
IRVING S. CUTTER
FRED C. ZAPFFE
JOHN T. MCCLINTOCK, Chairman.

On motion, duly seconded, the report was considered item by item.

On motion, duly seconded, the recommendation to accept the application for membership of the Faculty of Medicine of McGill University, Montreal, was endorsed, and the Chair declared that this college is thereby accorded membership in the Association.

On motion, duly seconded, the amendment of the constitution providing for a new section extending membership to graduate schools and university divisions and postgraduate schools was accepted for action at the next annual meeting of the Association, with the understanding that related articles and sections of the constitution be made to conform with this new Section 2 of Article III.

On motion, duly seconded, the recommendation dealing with the fifth, or so-called intern year, was accepted.

On motion, duly seconded, the recommendation as to the time of appointment of interns was accepted.

On motion, duly accepted, the report was adopted as a whole.

REPORT OF THE COMMITTEE ON EDUCATION AND PEDAGOGICS

In the absence of Dr. Ray Lyman Wilbur, this report was read at the afternoon session on Thursday by Dr. Begg, a member of the committee, thus complying with the constitution and by-laws, in which the

provision is laid down that no action can be taken on a report of this sort until twenty-four hours after its reading. The report was again read and presented for action.

REPORT OF THE COMMITTEE ON EDUCATION AND PEDAGOGICS

RAY LYMAN WILBUR, Chairman; ALEXANDER S. BEGG, THEODORE HOUGH, G. CANBY ROBINSON AND KENDRIC C. BABCOCK

DR. RAY LYMAN WILBUR: Medicine has now been firmly founded as a science. Practical dissection introduced into the curriculum of the medical school has been followed with the advance of science by laboratory work in physiology, bacteriology, pharmacology, biochemistry and a marked extension of the work in pathology, which has always played some part in medical education.

The history of the medical schools of America shows in their development the transitional processes from a medical school on the lecture and apprentice system to the fully developed university medical school in which medicine as a science has, perhaps to a dangerous extent, replaced medicine both as an art and a science.

Thirty years ago the medical schools of America were in a transitional and chaotic state, led for the most part by devoted and self-sacrificing practitioners. They were under-financed and unable to meet the increasing expense coming from the introduction of the laboratory method of teaching into the medical curriculum. In looking back, from the period in which the standards of medical schools were raised and many of them put into eclipse and others amalgamated with universities, one cannot fail to be impressed with the self-sacrifice of hundreds of active teachers and with the devotion to the profession of medicine which was manifested.

It became increasingly evident that if the findings of modern science were to be brought into the medical school, hospital and the active practice of medicine, actual training in physics, chemistry and biology must either be brought into the medical school proper or be required for admission. After a most careful series of studies and many struggles, through the efforts of this Association and the Council on Education and Hospitals of the American Medical Association, together with other forces, a general minimum standard of two years of college work, including certain specified amounts of chemistry, physics and biology, was put into effect in all of the schools recognized as belonging to the satisfactory group. Naturally, there have been many difficulties of admission and wide variability in the quality and character of the work given in these subjects in the different colleges. Some medical schools have gone beyond this minimum requirement, requiring the A. B. degree, others requiring one or two foreign languages.

There has been a constant attempt, with the crowding of more and more of the accumulated information in the sciences into the medical

curriculum, to force into the preparatory years more and more of the training in chemistry, embryology, psychology and other subjects. This has led to a situation where the majority of the medical students of the country have had practically the same premedical training and have received, on admission to the medical school, additional training delivered according to a particularly well worked out schedule of hours, making an almost uniform education.

While this standardization has been helpful in getting rid of faulty and cheap methods of education and in lifting the general standards of the profession, it has now reached the stage where we shall pay a very heavy price in loss of initiative if it continues without modification.

The preparation of a medical student in the medical school is a preliminary introduction to a life of study and activity in a profession, the information in which is growing at such a rate that in order to keep abreast one must be a persistent and constant student. It is impossible for anyone to foresee just what a type of practice the medical student of today will meet in ten or twenty years.

Preventive medicine, changes in our community and industrial life, change almost overnight the day-to-day work of the doctor. It is ever more difficult to see in what domains the inevitable advances in medicine will come. We need in the profession many men thoroughly trained in different fields to take full advantage of the discoveries constantly occurring in allied fields.

Every student body in every medical school should have in it students who have done some advanced work in physics, mathematics, philosophy, physiology, chemistry, pathology, bacteriology, psychology, English, classical literature, etc. Advance depends on the initiative of individuals and leadership, not on the steady forward march of the well-paced herd. There must, necessarily, be a central core of training in the medical school and a central core of preparation, therefore, but there should be the widest possible diversity in the training of different students beyond this point. The leadership in world medicine which is now open to the students of America should not be lost because of chains and bars and the lock-step method. The glory of medicine has always been that it had in it men of great initiative, of special training, with freedom from prejudice and with the open mind. We can chill the initiative of the medical student by overstandardization in the same way that a fagging system or a hazing system reduces to a dead level the activity of student groups.

One of the serious problems to be met in bringing about a change is that much of our present system is due to the deadening effect of legislation which has incorporated into statute our pigeon-hole curriculum and our card index methods. Some of this, of course, we must have.

Another problem is that we carry a large historical content in all of our premedical, preclinical and clinical subjects. It is as difficult for any science to keep its teaching material up to date as it is for a professor not to succumb to the satisfaction and ease of bringing out old lecture

notes, plastering on a few additions, and turning them loose on the students. Old and worn records grind out their tunes in the lecture halls of our university and medical school day after day. There is a place for the history of the past in medicine. It gives perspective, poise and balance, but it need not play a large part in the premedical and much of the medical training of the student.

For instance, qualitative and quantitative analysis in sequence following a general inorganic chemistry course has been the method of handling the teaching of chemistry which has grown up with an expanding science. When the medical student, who is to use largely organic, physiological and physical chemistry, has to spend a large part of his premedical training in chemistry in the manipulations in qualitative and quantitative analysis, this must necessarily be done at the cost of proper training in the other branches. It seems clear that as satisfactory if not better training in the fundamentals can be given a student who is going into medicine by selections from the fields of biochemistry, after there has been a training in the principles of chemistry in the general inorganic laboratory.

In a similar way there is great need for selection in the fields of physics and in biology. The real aim should be to give the student a conception of the principles and the terminology of these subjects, rather than a detailed or elaborate training in them. Edwin E. Slosson recently said:*

> "I fancy more physics has been taught to the present generation by the automobile than by the professors. The automobile is autocratic in its methods. It has the habit of stopping suddenly in the middle of the highway or on a railroad crossing and giving the chauffeur a quiz on the chemistry of combustion or the laws of mechanics. And the chauffeur is not allowed to pass until he has given a practical demonstration of his knowledge. Seventy per cent of book learning will not suffice."

To be able to think in terms of physics and in biology is certainly a prerequisite for any man who is to spend his life as a student of medicine. To have spent so many hours in a course of physics or chemistry by no means gives assurance that any great advantage has been gained. There is a need of rearranging courses in physics on the basis of the modern conceptions of that subject and of stimulating a change in the ordinary methods of giving instruction in biology. Overemphasis on the traditional course in either botany or zoology is not apt to give an appreciation of the processes of life. There is also a question whether students well versed in physics and chemistry cannot obtain in a modern chemical course a sufficient conception of biology without having it made a distinct prerequisite.

DR. ALEXANDER S. BEGG: In order to determine the reaction of teachers in medicine, Chairman Wilbur sent out to the various medical

Journal of Chemical Education (January, 1924, p. 3).

schools a questionnaire. In this questionnaire he had about six questions. The questions were:

1. Since English is required by practically all colleges, shall English be eliminated as one of the requirements for entrance to the medical school. The answer was almost uniformly No; in other words, we should retain English as a requirement.

2. That the amount of physics, chemistry and biology be reduced to a minimum determined on after careful study, and that where a student presents thorough training in one of these subjects he be excused from the full requirement in the others. It seemed to be the consensus of opinion that the advance work in any one of these subjects should not excuse a man from preparation in the others.

3. Can high school physics, chemistry and biology supplant the college requirements in these subjects? The answer was uniformly No. I think there was one school that thought it might possibly be done.

4. Is it possible for any student with an A. B. degree from a reputable college to be admitted without condition to the medical school? It will be necessary for him to do a certain amount of outside study. Experience would indicate that such students have a capacity to make good.

Again the majority of answers were in the negative, that the mere possession of an A. B. degree did not relieve him of preparation in certain of these preparatory sciences.

5. Should any student presenting evidence of having done good advance work in any scientific subject during two or more college years be admitted to the medical school without condition? Again there seemed to be an opinion that this should not be done without considerable restriction.

6. Should all language requirements be abolished? Of course, you know we have no foreign language requirements in our by-laws, but the reaction there again was in the negative.

In addition to this questionnaire, the chairman sent letters to each one of the members of the committee. He thought it would be wise to find out whether or not we have attained a minimum which it is necessary to attain. Second, have we reached a maximum beyond which it is undesirable to go? Again the committee seems to feel that the answer is in the affirmative. Third, have we included the right subjects offering the best type of training? While this was not specifically answered by the various members of the committee, the impression seems to be that this is in the affirmative. Fourth, is the content now given satisfactory? The feeling seems to be that we cannot dictate to the colleges beyond certain recommendations which are general.

The labor of the study was conducted by giving the assignment of chemistry to Dean Hough, the assignment of biology to Dean Robinson, the assignment of physics to myself, and then we asked Dean Babcock to study the question of repetition in college of high schools courses in various subjects.

The reports of these various individuals making up the committee have been gotten together and have been discussed in the committee. No report, incidentally, was received from Dean Babcock.

As a result of our deliberations, the committee has prepared certain recommendations.

RECOMMENDATION

I. That the Association, through its Committee on Education and Pedagogics, undertake the preparation of a list of colleges or arts and science which will be recognized as offering suitable preparation for students planning to enter on the study of medicine.

II. That the Association provide a system of reports to be filed by its members which will aid in the study and interpretation of results of preliminary education.

We had distinctly in mind that we did not want a card index affair with the name of every student that was admitted to the class. My own feeling was that what we wanted was statistical information giving the names of colleges in which the medical student had received his preparation and the results which were shown. For example, at the end of the first year it might be possible to report the number of failures in a given medical school by colleges, that this report might be continued over into the second year, and that in this way we and our college friends could get some information which would be of value.

We realize that the Council on Medical Education is keeping records of individual students in these sheet records which we all prepare and send in, but it seemed to us that the Association itself should undertake the preparation of some record which would be of value in later studies.

III. That the Association endeavor to act in an advisory capacity to the colleges and universities of the country engaged in preparing students for entrance to medical schools, especially regarding the content of courses, so that these institutions may have a guide for the changes in instruction that will keep progress in preliminary education abreast of that in medical education. This is the only organization that represents the medical schools and is, therefore, the only means open to the colleges to gain official information on this subject.

This idea was advanced by Dean Robinson with the notion that it was the duty of this Association to undertake this work, that there are many colleges and universities that are giving preparatory courses that want advice from time to time, and they would like to receive from us our proceedings when there is anything that comes up, for example, that has a bearing on this preliminary training.

IV. That Section 7 of the by-laws be changed to read as follows:

> Section 7. The minimum requirement for admission to medical colleges in membership in this Association is a four year high school education or its full equivalent and two

sessions' work in a college of arts and science approved by a committee of this Association on Education and Pedagogics. In no case shall a member of this Association admit a student from any college not on this approved list.

The following are strictly minimum requirements. Premedical students are urged to take additional college work whenever possible. The attention of premedical students and colleges af arts and science is especially called to the suggestions made below regarding additional work in chemistry, physics and biology.

I. High School Requirement.

The Committee on Education and Pedagogics shall place on the approved list only such colleges as require for admission of candidates for the baccalaureate degrees 15 units of high school work, with such distribution of these uits among the subjects of study as may at the time be generally required and enforced by standard American colleges. The certificate of premedical preparation given by the approved college to the medical school shall contain a statement that the candidate has satisfied the same high school admission requirements as the college enforces in the case of candidates for its baccalaureate degrees. This statement should be obtained and kept on file by the medical school in the case of students admitted with advanced standing, as well as those entering the first year class.

A unit is the credit value of at least thirty-six weeks' work of four or five recitation periods per week, each recitation period to be of not less than forty minutes' duration. In other words, a unit represents a year of study in any subject in a secondary school constituting approximately a quarter of a full year's work.

A satisfactory year's work in any subject cannot be accomplished under ordinary circumstances in less than 120 sixty-minute hours, or their equivalent.

II. Premedical College Course.

The minimum college work required for admission to medical schools in membership in this Association, in addition to the high school work specified above, shall be sixty semester hours of collegiate work, which is accepted at its full credit value toward a baccalaureate degree in a college approved by the Committee on Education and Pedagogics of this Association.

Except as herein specified, the following required subjects must either be included in the aforesaid sixty semester hours; or, in lieu thereof, for any of the said required subjects not included in the sixty semester hours of college work taken in course, the following certificate must be presented from the department giving instruction in that subject in a college on the approved list of this Association:

This Is to Certify, That.....
on....., 19...., has been personally examined by this Department in....., and found to possess a mastery of the subject equivalent to that which should be possessed by a student who has obtained full credit for a course of the content and semester-hour value required by the Association of American Medical Colleges.

(Signed).....

Title.....

Department of.....

College or University.....

Date.....

(Seal.)

This certificate in any subject or in any group of subjects does not relieve the candidate from the responsibility of having his full sixty semester hours. He has got to have sixty semester hours. He may not have included in his sixty semester hours one or two of the required subjects, in which case he must have prepared this certificate, and it is noted that this certificate is only given upon examination.

REQUIRED SUBJECTS:	Minimum Semester Hours
General Chemistry (*a*)	8
Organic Chemistry (*b*)	6
Physics (*c*)	8
Biology (*d*)	8
English Literature and Composition (*e*)	6

A semester hour is the credit value of sixteen weeks' work, consisting of one lecture or recitation period per week; at least two hours of laboratory work to be considered as the equivalent of one lecture or recitation period.

(*a*) *General Chemistry.*—At least eight semester hours required, including at least four semester hours of laboratory work. In the interpretation of this rule work in qualitative analysis may be counted as general chemistry.

It is highly desirable that either the elements of physical chemistry be included in the course in general chemistry, or presented in a supplementary course in elementary physical chemistry.

(*b*) *Organic Chemistry.*—Six semester hours required, including at least two semester hours of laboratory work. Eight semester hours, including four semester hours of laboratory work are recommended to insure adequate preparation for biological chemistry. (Effective after January 1, 1925. Until that time four semester hours required.)

Dean Hough has studied the situation and has found that most of the colleges are giving more than the amount of work we have specified as a minimum, and the objection to the old four-hour requirement was that in some instances the whole course in organic chemistry involved eight semester hours and a student would take

one semester's work, get his credit for four hours, and leave the course before it was completed.

(*c*) *Physics.*—Eight semester hours required, of which at least two semester hours shall consist of laboratory work. It is urged that this course be preceded by a course in plane trigonometry.

In addition to the required course in general physics, an elective course should be provided, suitable for students who desire more knowledge of physics than the general course affords, but who expect to apply their knowledge to medicine or biology, rather than to engineering or physics.

Teachers of physics have studied this subject and have published a report, issued in 1923, in which they concluded that a course in general physics was all that was necessary as a premedical preparation. However, they felt that the amount of time should be twelve semester hours. Our committee has felt that it is not wise to increase the present requirement, but, inasmuch as the teachers in physics themselves are interested in this subject, that an increase may eventually come.

(*d*) *Biology.*—Eight semester hours required, of which at least four semester hours shall consist of laboratory work. This requirement may be satisfied by a course of eight semester hours in either General Biology or Zoology, or by courses of four semester hours each in zoology and botany, but not by botany alone. Courses in physiology and hygiene, sanitation, entomology, bacteriology, histology and similar subjects covered in the medical curriculum cannot be accepted as part of the premedical college requirements in biology.

In all cases the premedical biological work should emphasize the great generalizations of biology—*e. g.,* the cell doctrine, comparative anatomy and embryology, recapitulation of phylogeny in ontegeny, adaptation to environment, etc. Special attention is called to the value of an elective second year course in general physiology in which a special study is made of the application of physics and chemistry to life processes.

Students who present at least 90 semester hours of college work may substitute for the above biologic requirements at least 8 semester hours in the psychologic or sociologic sciences.

(*e*) *English Composition and Literature.*—The usual introductory college course of six semester hours or its equivalent is required.

Section 7a. Any member of this Association may, with the consent of the Executive Council, substitute for the above plan, whereby all premedical academic and scientific college requirements must be fulfilled by the applicant before admission to the first year class, a six year combined premedical and medical curriculum, provided the equivalent of at least sixty semester hours shall consist of subjects ordinarily given in the academic departments of standard American colleges of arts and science and that the required subjects above specified are included. The medical school must submit to the council of this Association the proposed six year curriculum giving the sequence of studies and the content and credit value of each course offered. Subsequent proposed changes in this six year course must likewise be submitted to the Executive Council for approval before they can go into effect.

Dr. E. S. Dickson moved that the report be adopted as read. No second.

Dr. Ray Lyman Wilbur suggested that the various items in the report be considered ad seriatum so as to give opportunity for free discussion.

The first item (I) was read. Dr. Wilbur moved that the Association accept the list of colleges of arts and sciences as prepared by the American Council on Education as offering suitable preparation to students planning to enter on the study of medicine; and that, in addition, the Committee on Education and Pedagogics be authorized to prepare an additional list of acceptable institutions when the students of such institutions are accepted by the neighboring state universities.

Dr. B. D. Myers amended this motion by substituting for "American Council on Education" "North Central Association of Secondary Schools and Colleges; Southern Association of Colleges, and the New England Association of Preparatory Schools."

Dr. C. N. Meader offered the following amendment to Dr. Wilbur's motion as amended by Dr. Myers: That a school in good standing in this Association may, in exceptional instances, when it is honestly convinced that a college not on one of the present accredited lists is giving its students a preparation for the study of medicine equivalent to that offered by accredited colleges, admit students from that college with the consent of the Executive Council of this Association.

Dr. E. P. Lyon moved to lay the motion and the amendments on the table. The motion was duly seconded and carried by a vote of 26 to 19.

The second item (II) was read. On motion of Dr. McClintock, which was seconded, this recommendation was adopted.

The third item (III) was read. On motion of Dr. Darrach, duly seconded, this recommendation was adopted.

The fourth item (IV) was read.

The chairman announced that inasmuch as Item I of the report had been tabled, this item was *ipso facto* dead.

Dr. Wilbur objected to this ruling by the Chair.

Dr. Hough appealed from the decision of the Chair.

Dr. Kober moved that action on this recommendation be postponed for one year. No second.

Dr. Myers moved that the ruling of the Chair be sustained. No second.

COMMITTEE OF THE WHOLE

Dr. McClintock thereupon moved that the Association resolve itself into a committee of the whole for the purpose of discussing this report further, freely and unofficially so that the membership could be guided in its action on the report either at this time or at the next annual meeting.

This motion was duly seconded and carried.

The delegates, in Committee of the Whole, then discussed the report of the Committee on Education and Pedagogics, Dr. Wilbur presiding.

The delegates announced about thirty minutes later that they were ready to resume in executive session.

President Cutter asked for a report from the Committee of the Whole.

Dr. Wilbur, chairman of the Committee of the Whole, reported that the report had been discussed at length, and moved that further consideration of the report be deferred until the next annual meeting, with instructions to the committee to review and revise the report to accord with the discussion held in Committee of the Whole. Seconded and carried.

COMMISSION ON REQUIREMENTS FOR DEGREE OF DOCTOR OF MEDICINE

At this juncture Dr. Hugh Cabot moved "that the Executive Council of this Association appoint a commission which shall include representation from the Council on Medical Education and Hospitals of the American Medical Association and the American Council on Education which shall carry out a thorough investigation of what should be the essential requirements for the degree of Doctor of Medicine, and shall prepare a definite plan for a basic curriculum adjusted to meet present conditions; and that the Executive Council also be authorized to ask for the necessary financial support."

Dr. Darrach seconded this motion, which, on vote, was carried.

REPORT OF COMMITTEE ON MEDICAL RESEARCH

Dr. L. S. Schmitt, chairman of the Committee on Medical Research, presented the following report:

REPORT OF COMMITTEE ON MEDICAL RESEARCH

Your committee has nothing further to report relative to the advancement of investigation or research during the past year.

No serious obstacles to research have come to our notice during a like period.

The committee invites attention to an association known as the Society of Friends of Medical Progress. This is a lay national society, organized and incorporated in the year 1923, (1) to encourage and aid all research and human experimentation for the advancement of medical science; (2) to inform the public of the truth concerning the value of scientific medicine to humanity and to animals; (3) to resist the efforts of the various persons and societies constantly urging legislation dangerous to the health and well-being of the American people.

Therefore, it is recommended that the following resolution be adopted by the Association:

Resolved, That the Association of American Medical Colleges indorse the aims and purposes of the Society known as the Friends of Medical Progress and that all persons interested in the progress of medicine be urged to become members of this society.

(Signed) L. S. SCHMITT, *Chairman.*
W. B. CANNON,
C. N. MEADER.

On motion, the report was received and ordered published in the transactions.

UNIFORM MEDICAL PRACTICE ACTS

Dr. William C. Borden here moved "that the Executive Council of this Association be directed to consider and report to the Association at the next regular annual meeting on the matter of uniform provisions in the medical practice acts of all states, which provisions may be supported by this Association, such provisions to be so framed that they will safeguard the public by having provisions not favoring any cult or method or practice, but which shall prevent the treatment of the sick and injured in any way by any person or persons publicly announcing themselves as treating the sick or injured, unless such person or persons are properly qualified so to do."

On motion, duly seconded, this motion was carried.

REPORT OF NOMINATING COMMITTEE

The Nominating Committee, consisting of Drs. A. S. Begg, chairman; C. N. Meader and C. P. Lommen, presented the following report for consideration:

President—RAY LYMAN WILBUR.
Vice-President—HUGH CABOT.
Secretary-Treasurer—FRED C. ZAPFFE.
Executive Council—DAVID L. EDSALL (2 years).
C. P. EMERSON (2 years).
G. CANBY ROBINSON (1 year).

On motion of Dr. Kober, the Chair was authorized to cast the unanimous ballot of the delegates for the election to office of those named in the committee's report. This was done and the Chair declared the nominees duly elected to office.

Dr. Wilbur here took the chair and briefly addressed the meeting.

PLACE OF 1925 MEETING

The Secretary announced that invitations for holding the 1925 meeting had been received from Buffalo, Cincinnati, Cleveland, Minneapolis and Boston.

The matter was submitted to a vote. Dr. Cabot and Dr. Schmitt were appointed tellers. The poll showed that Boston and Cincinnati had received the highest number of votes cast, but neither had a majority of the votes cast.

Another vote was taken to decide as between Boston and Cincinnati. It resulted in a tie. The president cast the deciding vote for Boston.

The time of meeting is set by the Executive Council in accordance with the constitution and by-laws.

REPORT OF DELEGATES TO OTHER ORGANIZATIONS

Dr. Fred C. Zapffe, with Dr. Irving S. Cutter, delegated to the *Council on Education and Hospitals of the American Medical Association,*

reported that the meeting of the Council had been missed because of the fact that no advice had been received that the time of meeting had been changed from the afternoon to the morning.

Dr. Zapffe also reported that he had attended the meeting of the *Federation of State Medical Boards;* that no action had been taken on any matters of interest to this Association, and that the officers of the preceding year had been reelected. A full report of this meeting was published in the Bulletin of the Federation.

The following report was presented by Dr. Zapffe on the meeting of the *American Conference on Hospital Service*:

REPORT OF DELEGATE TO AMERICAN CONFERENCE ON HOSPITAL SERVICE

The American Conference on Hospital Service was organized in September, 1919, in Cincinnati, Ohio, by representatives of twelve national organizations engaged in promoting the improvement of hospital standards and became charter members. These organizations are: American Hospital Association; Catholic Hospital Association of the United States and Canada; American Medical Association; American College of Surgeons; American Association of Industrial Physicians and Surgeons; Association of American Medical Colleges; Federation of State Medical Boards of the United States; Medical Department of the United States Army; Bureau of Medicine of the United States Navy; United States Public Health Service; American Nurses' Association; American Association of Hospital Social Workers. Since then five other national corporations with similar relationship to hospital service have become constituent members: National League of Nursing Education; National Association of Public Health Nursing; American Dietetic Association; American Institute of Homeopathy; National Tuberculosis Association.

The object of the Conference is "the betterment of hospital service in the United States of America and in the Dominion of Canada." This is interpreted to be the promotion of coordination and cooperation in the work of all the national organizations engaged in the improvement of hospital service to the sick and injured and in the development and improvement of teaching, research and other activties within the hospital as well as welfare work in the community.

In June, 1920, the Conference found it necessary to establish a clearing house for the dissemination of information relating to the solution of problems in the hospital field. To meet this demand, the Conference organized the Hospital Library and Service Bureau.

Financial support of the library covering a period of three years from July 1, 1920, with an annual budget of $20,000, was secured through contributions from some of the constituent organizations, from individuals and from the Rockefeller Foundation.

The policy adopted in the administration of the library was to collect, tabulate and index all information on the various phases of hospital and public health activities. The character of the work of the constituent

members of the Conference includes a large number of interests related to the problems of hospital and public health work, and in the collection of a well-balance material dealing with all of these subjects.

The Hospital Library and Service Bureau is much more than a library of hospital literature, although there has been collected, classified, digested and made available a wealth of information on the organization, building, equipment and administration of hospitals, dispensaries and allied institutions. As a special library, its material is more complete than anything of like character in the world; it is the service bureau phase of the institution that has made its contribution to humanitarian aims noteworthy.

The library material is gratuitously available to hospital executives, trustees, building committees, health officials and others interested in hospitals and welfare work. A second outstanding activity of the Conference is the promotion of the education and training of nonmedical hospital, clinical and laboratory assistants who may be utilized as aides to the intern service when this is necessary, or as substitutes in hospitals which are unable to secure interns. The work of these nonmedical assistants in the wards and laboratories will be carried on under the direction of and must be reviewed and checked by the attending staff or by the house staff, or by both. A committee composed of representatives of the constituent organizations of the Conference will begin work in the near future in making surveys and in (at the request and at the expense of communities in cities and in rural districts) cooperation with the local medical profession, health officers, business men's associations, churches, women's clubs and other agencies and, based upon the information obtained, to give advice and aid in the organization of the local hospitals and dispensaries, infant and child welfare, prenatal and maternity care, rehabilitation of the physically disabled and other welfare activities which will afford the community efficient service, financial economy and practical results.

The education and training of these needed surveyors and advisors in community cooperative welfare organization can be accomplished by a program which will secure the cooperation of educational institutions, hospitals, social organizations and other agencies.

The officers and trustees look forward with confidence to greater achievement in the future, fortified with the moral support, the cooperation and, as far as each is able, the financial aid of the constituent membership of the Conference in its specific work.

At the annual meeting of the Conference held in Chicago March 3, 1923, Dr. Fred C. Zapffe was elected to represent the Association of American Medical Colleges on the Board of Directors of the Conference for a period of three years. The president of the Conference is Dr. Frank Billings. The headquarters is situated at 22 East Ontario Street, Chicago.

(Signed) Fred C. Zapffe,
Irving S. Cutter.

On motion, duly seconded, these three reports were received and ordered published in the transactions.

VOTE OF THANKS

At this juncture Dr. Hough moved "that the Association of American Medical Colleges express its grateful appreciation of the hospitality of the University of Nebraska, Creighton University and the citizens of Omaha, notably those of the local medical profession. Their generous provision for the needs of the meeting has contributed largely toward making it one of the most successful meetings in our history. We would further congratulate the State of Nebraska on the high standard of medical education already achieved and the bright prospects of future advance."

The motion was seconded and passed unanimously by a rising vote.

There being no further business to come before the meeting, a motion to adjourn was entertained, seconded and passed.

(Signed) IRVING S. CUTTER, *President.*
FRED C. ZAPFFE, *Secretary.*

MINUTES OF THE ORGANIZATION MEETING OF THE EXECUTIVE COUNCIL

A meeting of the Executive Council was held in the medical school of the University of Nebraska at 2:30 p. m. March 1, 1924, with the following members of the Council present: Dr. Ray Lyman Wilbur, Dr. David L. Edsall, Dr. G. Canby Robinson, Dr. Irving S. Cutter and Dr. Fred C. Zapffe. The vice-president of the Association, Dr. Hugh Cabot, was also present.

The meeting was called to order by the Secretary of the Association, Dr. Zapffe.

On motion of Dr. Cutter, duly seconded, Dr. David L. Edsall was elected chairman of the Executive Council for the ensuing year.

On motion, duly seconded, delegates to other organizations were appointed as follows:

Council on Medical Education and Hospitals of the American Medical Association: Dr. Ray Lyman Wilbur.

Federation of State Medical Boards: Dr. Fred C. Zapffe.

American Conference on Hospital Service: Drs. Fred C. Zapffe and G. Canby Robinson.

On motion, duly seconded, it was voted to hold the 1925 meeting of the Association on the Thursday, Friday and Saturday preceding the meeting of the Annual Congress on Medical Education.

The following Committee on Education and Pedagogics was appointed: Dr. Alexander S. Begg, Boston University, chairman; Dr. Theodore Hough, University of Virginia; Dr. G. Canby Robinson, Vanderbilt University; Dr. Burton D. Myers, Indiana University, and Dr. L. S. Schmitt, University of California.

On motion, duly seconded, the Committee on Education and Pedagogics was authorized to meet once, at some convenient place to be chosen by the committee, before the next annual meeting, the expenses of such meeting to be defrayed by the Association.

Pursuant with the motion made by Dr. Cabot during the executive session of the Association, the following committee was appointed: Dr. Hugh Cabot, University of Michigan, chairman; Dr. David L. Edsall, Harvard University, and Dr. William Darrach, Columbia University.

Pursuant with the motion made by Dr. Borden with reference to endeavoring to secure uniformity in medical practice acts, Dr. Fred C. Zapffe was delegated to take charge of this work.

The following Committee on Medical Research was appointed: Dr. Cecil Drinker, Harvard University, chairman; Dr. Don R. Joseph, St. Louis University, and Dr. Lewis H. Weed, Johns Hopkins University.

On motion of Dr. Wilbur, duly seconded, it was voted not to appoint a Committee on Equipment this year.

On motion, duly seconded, the secretary was voted an honorarium for the ensuing year of $1,000, and the chairman of the Executive Council $200.

(Signed) DAVID L. EDSALL, *Chairman.*

Adjourned. FRED C. ZAPFFE, *Secretary.*

OFFICERS AND COMMITTEES FOR 1924-1925

President: RAY LYMAN WILBUR, San Francisco.
Vice-President: HUGH CABOT, Ann Arbor, Michigan.
Secretary-Treasurer: FRED C. ZAPFFE, 3431 Lexington Street, Chicago.

EXECUTIVE COUNCIL

DAVID L. EDSALL, Chairman, Boston.
WALTER L. NILES, New York.
G. CANBY ROBINSON, Nashville.
CHARLES P. EMERSON, Indianapolis.
IRVING S. CUTTER, Omaha.
FRED C. ZAPFFE, Chicago.

COMMITTEES

Committee on Education and Pedagogics

ALEXANDER S. BEGG, Chairman, Boston University.
BURTON D. MYERS, Indiana University.
G. CANBY ROBINSON, Vanderbilt University.
THEODORE HOUGH, University of Virginia.
L. S. SCHMITT, University of California.

Committee on Medical Research

CECIL DRINKER, Harvard University.
DON R. JOSEPH, St. Louis University.
LEWIS H. WEED, Johns Hopkins University.

MEMBERS

ALABAMA

University of Alabama, School of Medicine, University.

CALIFORNIA

Stanford University School of Medicine, San Francisco.
University of California Medical School, San Francisco.

CANADA

McGill University Faculty of Medicine, Montreal.

COLORADO

University of Colorado School of Medicine, Boulder and Denver.

CONNECTICUT

Yale University School of Medicine, New Haven.

DISTRICT OF COLUMBIA

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

GEORGIA

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

ILLINOIS

Loyola University School of Medicine, Chicago.
Northwestern University Medical School, Chicago.
Rush Medical College (University of Chicago), 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

Tulane University of Louisiana School of Medicine, New Orleans.

MARYLAND

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

MASSACHUSETTS

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

MICHIGAN

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

MINNESOTA

University of Minnesota Medical School, Minneapolis.

MISSISSIPPI

University of Mississippi School of Medicine, University.

MISSOURI

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

NEBRASKA

John A. Creighton Medical College, Omaha.
University of Nebraska Medical College, Omaha.

NEW YORK

Albany Medical College, Albany.
Columbia University College of Physicians and Surgeons, New York.
Cornell University Medical College, Ithaca and New York.
Long Island College Hospital, Brooklyn.

Syracuse University College of Medicine, Syracuse.
University and Bellevue Hospital Medical College, New York.
University of Buffalo Department of Medicine, Buffalo.

NORTH CAROLINA

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

NORTH DAKOTA

University of North Dakota School of Medicine, University.

OHIO

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

OKLAHOMA

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

PENNSYLVANIA

Hahnemann Medical College and Hospital, Philadelphia.
Jefferson Medical College of Philadelphia.
University of Pennsylvania School of Medicine, Philadelphia.
University of Pittsburgh School of Medicine, Pittsburgh.
Woman's Medical College of Pennsylvania, Philadelphia.

PHILIPPINE ISLANDS

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

SOUTH CAROLINA

Medical College of the State of South Carolina, Charleston.

SOUTH DAKOTA

University of South Dakota College of Medicine, Vermilion.

TENNESSEE

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

TEXAS

Baylor University College of Medicine, Dallas.
University of Texas Department of Medicine, Galveston.

VERMONT

University of Vermont College of Medicine, Burlington.

VIRGINIA

Medical College of Virginia, Richmond.
University of Virginia Department of Medicine, Charlottesville.

WEST VIRGINIA

West Virginia University School of Medicine, Morgantown.

WISCONSIN

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

AFFILIATED MEMBER

Meharry Medical College, Nashville, Tenn.

ASSOCIATE MEMBERS

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

HONORARY MEMBERS

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