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CONTAINING THE REPORT

OF THE

FIFTH ANNUAL CONFERENCE

OF THE

COUNCIL ON MEDICAL EDUCATION

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This report has been unavoidably delayed in the desire to include the reports of all subcommittees on medical curriculum.

COUNCIL ON MEDICAL EDUCATION OF THE AMERICAN MEDICAL ASSOCIATION

Fifth Annual Conference, held at the Auditorium Hotel, Chicago, April 5, 1909

Besides the members of the Council, 90 delegates were present, representing 21 state examining boards, 15 state medical societies, 2 departments of the government services, 1 confederation of examining boards, 1 college association and 3 national medical associations, as well as 35 medical and liberal arts colleges.

CHAIRMAN'S ADDRESS

The conference was called to order at 10 a. m. by the chairman, Dr. Arthur Dean Bevan, who delivered the following address:

Gentlemen, Delegates from the licensing bodies, from the state medical societies, from the National Institute of Homeopathy, from the National Eclectic Medical Association, from the medical college associations, from the confederations and associations of state licensing boards, from the United States Army and Navy Medical Corps and the Public Health and Marine-Hospital Service, from the schools of liberal arts, officers of the American Medical Association and invited guests.

The Council on Medical Education of the American Medical Association has invited you to this fifth annual conference to discuss the subject of medical education and to ask your advice and cooperation in the effort to elevate the standards of medical education in this country.

It might be well to briefly review the work of the four previous conferences. The first conference was held in Chicago, April 20, 1905. At this conference the questions of preliminary education, medical curriculum and the relation of the college of liberal arts to the medical school were discussed, as a result of which the Council formulated the following as the minimum standard of the American Medical Association:

MINIMUM STANDARD

(a) A preliminary education sufficient to enable the student to enter the freshman class of our recognized universities, (b) the passing on the credentials of such an education by a state official, (c) the graduation from an approved medical college requiring a four years' course of not less than 30 weeks each year with 30 hours each week, of actual work, (d) the passing of an examination for licensure before a state board.

IDEAL STANDARD

The Council further formulated a so-called ideal standard which should be secured as rapidly as the conditions throughout the country warranted. This ideal standard was briefly as follows:

(a) A four year high school education, (b) a year's university training in physics, chemistry and biology, (c) four years of medicine proper, and (d) one year as interne in a hospital or dispensary.

THE SECOND CONFERENCE

At the second conference, held in Chicago, May 12, 1906, probably the most important facts presented were the standings of the various medical colleges based on the failures of their graduates in examinations before state boards. The colleges were divided into three groups: those having less than 10 per cent. of failures; those having from 10 to 20 per cent., and those having above 20 per cent. A fourth unclassified list was made of those colleges which had insufficient data to permit of comparison. These reports, which are published annually in the State Board statistics prepared by the Council, have been productive of much good in stimulating faculties to guard against the graduation of illy prepared students.

THE THIRD CONFERENCE

At the third conference, held in Chicago, April 29, 1907, a detailed report of a personal inspection made by members of the Council of all the medical schools of the United States was presented. In this inspection the schools were marked on a civil service basis consisting of ten points covering the essentials of a modern medical college, these 10 points making a possible 100. And on this basis the colleges as graded were divided into three groups. The result was as follows: An acceptable group of 82 colleges with marks from 70 to 100, a conditioned group of 46 colleges with marks from 50 to 70, and a rejected group of 32 colleges with marks below 50.

This personal inspection of colleges has been continued and a second inspection will soon be completed.

THE FOURTH CONFERENCE

The fourth annual conference held in Chicago, April, 1908, was from many standpoints most encouraging and interesting. The secretary presented a graphic study of medical education in the various states of the union and in the twenty most important countries of the world showing the comparative position of medical education in this country with that of the rest of the world.

It was revealed that while this country had a few medical colleges equal to any in the world, it was nevertheless far behind other nations in standards of both preliminary and medical education. More encouraging was the report of a campaign carried on during the year by the Council to secure the adoption by medical colleges of higher preliminary standards. This report brought out the fact that more than fifty first-class schools in this country had agreed to accept what has been adopted by all the rest of the world, i. e., a five year medical

course. This is to be brought about by adding to our present preliminary requirements of a four year high school course, at least one year of physics, chemistry and biology.

This advance requirement has become so general that it will doubtless be adopted by all first-class schools within the next few years and thus place American medical education on a par with that of England, France, Germany, Austria, Canada—in fact, with that of all our neighbors and rivals in progress and civilization.

In the study of medical education in this country, as we compare the existing conditions with those existing in Germany and England, we are shocked by our many short-comings. However, we are tremendously encouraged by the progress that has been made in the last five or ten years, and are urged to redouble our efforts to secure uniform and acceptable American standards. This can be done only by wiping out of existence a large number of alleged medical colleges which at present disgrace American medicine.

AGENCIES AT WORK

In the efforts to elevate standards and secure acceptable conditions in medical education many agencies are doing splendid work: The medical colleges themselves, the state examining boards, the associations of medical colleges, the universities and colleges of liberal arts, the confederations of state boards, the medical societies, etc. After all has been said, however, the clear and definite fact remains that the legal power to control and elevate the standards of medical education rests entirely and alone with the state boards.

While in some states the conditions of general education and public opinion are not such as would warrant the immediate exaction of proper standards, in most states the conditions would warrant such a stand at the present time. In the Middle West, for instance, if such states as Ohio, Indiana, Michigan, Illinois, Kentucky, Wisconsin and Iowa should do as is to be done in Minnesota, North Dakota, South Dakota and Colorado, demand of their medical men a higher preliminary education, including thorough work in physics, chemistry and biology, public and professional opinion would doubtless unanimously support them in such a position. Then the battle for higher medical standards in this country would be practically won. Even in the other states the general educational advance is such that proper standards can be demanded within the next few years.

Most of you are familiar with the fact that our northern neighbor, Canada, has just added the preliminary science year to her medical curriculum.

COLLEGE MERGERS

Another encouraging fact to be noted is the mergers being made among medical schools whereby stronger schools are resulting. Notably in Indiana, all of the regular schools in the state merged into the medical department of Indiana University, while in Kentucky all of the medical schools merged into the University of Louisville. In Cincinnati the two regular schools merged into the University of Cincinnati; in Minnesota Hamline merged into the medical department of the University of Minnesota.

There are numerous other cities where mergers might be brought about if those interested in general education and those in medical education in each city would work together to secure them. For example, if all the medical colleges of any large city, such as Chicago, Philadelphia, St. Louis or others could be merged into one great university medical school, such as are to be found in Berlin, Paris or Vienna, it would be of the greatest possible advantage to medical education in America.

In the evolution of general and medical education in this country it is becoming more and more evident that a well-rounded university needs a strong medical department and it is now equally clear that a medical school can not reach the highest stage of its development except as the medical department of a strong university. It is evident that within a few years the medical schools of this country will, with few exceptions, be the medical departments of universities. Fortunately for the medical school, the university needs the medical school quite as much as the medical school needs the university, so that almost any independent medical school of real merit can secure desirable union with a university. And this change will solve most of our present problems in medical education.

PRESENT DEMANDS

Briefly, what does the present situation of medical education demand for a satisfactory solution?

1. The passing of commercial medical schools and the merging of the better schools to form strong medical departments of universities.

2. Endowments both private and state for the proper maintenance of such medical departments. The experience of the last few years has shown clearly that the modern medical school needs such endowments, as it can not be properly supported on the fees of students, and it has been demonstrated that such endowments can not be secured for the independent medical schools.

3. As the most important public health measure each state should demand through its state licensing board complete and thorough medical preparation of those seeking to practice medicine within its boundaries. This must include (*a*) a proper preliminary education, (*b*), a thorough medical course pursued in a reputable medical college, and (*c*) a practical and thorough examination such as will be an actual test of applicant's ability to practice medicine.

The program of to-day consists of three topics: The report of a committee of 100 on the medical curriculum, the desirability and value of such curriculum, necessary equipment, etc., from the state board standpoint, and the question of making the state board examination more of a practical test of the candidate's ability to practice medicine.

This conference is purely informal. Its purpose is to elicit the widest possible discussion of the topics considered. It is hoped that all delegates will take an active part in the discussions. It is my great pleasure to welcome you all in the name of the American Medical Association.

Report of the Secretary

Following the address of the Chairman, the Secretary of the Council, Dr. N. P. Colwell, gave the following report of the work of the past year

Mr. Chairman, Members of the Council and Delegates:

Gentlemen:—For five years the Council on Medical Education has been working for higher and more uniform standards of medical education. In this time many changes for the better have been brought about. Such influence as the Council may have had toward these improvements has been due largely to the following facts:

1. The Council is the committee on education of the medical profession of America, represented by the American Medical Association. As such, its interests are national and its object is the betterment of medical education in all sections of the country.

2. It is a permanent committee, thereby exerting a constant, steady influence for improvement, not possible through temporary committees, however excellent their work might be.

3. Its headquarters at the home of the medical profession of America and its connection with the *Journal of the American Medical Association*, with its extensive body of correspondents, made it possible to obtain much information which otherwise could not have been secured.

4. An abundance of information has been collected, tabulated and published regarding medical colleges, standards, students, graduates, facilities and equipment, as well as much information regarding the requirements for license to practice medicine both in this country and abroad. Information has also been collected regarding elementary, secondary and collegiate education.

5. This information, formerly not available, has thrown much light on medical education, revealing quite clearly problems which otherwise could not have been seen.

6. As problems have arisen they have been presented at annual conferences on medical education for discussion. These annual conferences have been held under the auspices of the Council on Medical Education and to them are invited as delegates those who are interested and whose advice and influence may be helpful in elevating the standards of medical education: from the state licensing boards, state medical societies, confederation of examining boards, college associations and the United States services, as well as from colleges of liberal arts and other interested organizations. They have been attended by an increasing number of delegates each year. They are entirely informal and are devoted to the discussion of the more urgent problems of medical education, the reports of which have been given wide circulation in the columns of the *Journal of the American Medical Association* and by reprints. These conferences have undoubtedly been a strong influence favoring higher and more uniform standards.

PRELIMINARY EDUCATION

Investigation reveals much confusion in standards not only among medical schools, but also in high schools, colleges and

all other departments of education. No previous time, however, has seen so many forces at work in the effort to standardize the different departments and to develop system and uniformity.

High Schools.—Many of the states are seriously lacking in good high schools, which observation applies as much to a number of states north of the Mason and Dixon line as to those south of it. In fact, there are very few states which have all their high schools well organized, well equipped and supplied with well qualified, college-trained teachers. This department of education is now being systematically taken up by various organizations, including the General Education Board, and throughout the southern states a high-school inspector with the title of a "Professor of Secondary Education" has been placed with each state university. Public sentiment throughout the south is rapidly being awakened and already vast sums have been appropriated by legislatures to develop high schools. Leading educators in the south state that within four to five years that section will be fairly well provided with four-year high schools.

Colleges and Universities.—Several educational organizations, including the Associations of Universities and the Carnegie Foundation for the Advancement of Teaching, are now at work in an effort to standardize colleges and universities, many of which, at the present time, from an educational standpoint, have no right to such titles, since they give courses of little more, or even of less value, than those in some of the better high schools.

PRELIMINARY REQUIREMENTS OF MEDICAL SCHOOLS

Seventeen medical colleges already require two or more years of work in a college of liberal arts for admission. These colleges and the years when such requirement began are as lows:

College	Began
Johns Hopkins University Medical Department	1893
Harvard Medical School	1900
Western Reserve University, Medical Department	1901
University of Chicago, Rush Medical College	1904
University of California, Medical Department	1905
University of Minnesota, Coll. of Med. and Surg	1907
University of North Dakota, College of Medicine	1907
University of Wisconsin, College of Medicine	1907
Cornell University Medical College	1908
Wake Forest College, School of Medicine	1908
Leland Stanford Junior University, Department of Medicine	1909
Yale Medical School	1909
*Northwestern University Medical School	1909
*University of Kansas, School of Medicine	1909
University of Michigan, College of Medicine	1909
*University of Nebraska, College of Medicine	1909
University of South Dakota, College of Medicine	1909

* One year required for the session of 1908-09.

Eleven other colleges have definitely announced an increase in their entrance requirements to two or more years in a college of liberal arts. These and the dates when such requirements will become effective are as follows:

College	Begins
University of Colorado, School of Medicine	1910
*Indiana University School of Medicine	1910
*State University of Iowa, College of Medicine	1910

Drake University, College of Medicine.....1910
†University of Missouri, Department of Medicine.....1910
John A. Creighton Medical College.....1910
Dartmouth Medical School.....1910
Columbia University, College of Physicians and Surgeons....1910
*Syracuse University, College of Medicine.....1910
*University of Pennsylvania, Medical Department.....1910
*University of Utah, Medical Department.....1910

* One year required for the session of 1909-10.
† One year has been required since 1903.

The 22 following colleges either already require one year of work in a college of liberal arts in addition to a four-year high school course, or have announced their intention to do so on or before the year given:

College	In Force
Fordham University, School of Medicine	1908
University of North Carolina, Medical Department	1909
Oakland College of Medicine and Surgery	1910
Denver and Gross College of Medicine	1910
College of Physicians and Surgeons, Chicago	1910
Hahnemann Medical College, Chicago	1910
Kansas Medical College	1910
Tulane University of Louisiana, Medical Department	1910
St. Louis University School of Medicine	1910
Washington University, Medical Department	1910
University Medical College, Kansas City	1910
University of Cincinnati, Medical Department	1910
Starling-Ohio Medical College	1910
Cleveland College of Physicians and Surgeons	1910
University of Oklahoma School of Medicine	1910
University of Oregon, Medical Department	1910
Vanderbilt University, Medical Department	1910
University of Texas, Medical Department	1910
*University of Virginia, Department of Medicine	1910
West Virginia University, College of Medicine	1910
Marquette University Medical Department	1910
Wisconsin College of Physicians and Surgeons	1910

* Requires a three year high school course plus one year of college work.

Several other colleges announced to us that higher requirements had been adopted. Two have since rescinded their action, five have merged into other colleges, and others, on inspection, being found unworthy of recognition, were omitted from the lists. The schools above named, however, have made definite statements in their announcements regarding the increase in their entrance requirements and doubtless mean what they say.

In support of these higher standards, the State Examining Boards of six states have established higher requirements of preliminary education. These states and the years when the requirement will become effective are as follows:

State Examining Board of	No. of years Required	Affects students matriculating	Affects all applicants after
Minnesota	2	1908-09	1912
Connecticut	1	1910-11	1911
North Dakota	2	1907-08	1911
South Dakota	1	1907-08	1911
Colorado	1	1908-09	1912
Kansas	1	1910-11	1914

Several other states are contemplating a similar increase in their requirements of preliminary education. In some of these the increase would doubtless be welcomed, since their medical colleges have already adopted the increased requirements.

MEDICAL COLLEGE MERGERS

Since our last report there have been five important mergers of medical colleges by which nine medical schools are replaced by four stronger ones. These mergers were as follows:

1. At Louisville, Ky., the Louisville and Hospital Medical College, the Kentucky School of Medicine and the University of Louisville Medical Department united, retaining the name of the University of Louisville Medical Department. This leaves but one regular medical college in Louisville, where there were five colleges two years ago. As a direct result of this merger, the school has received $25,000 from the city of Louisville, and steps have been taken to build a new city hospital, which is to be largely under the control of the medical school.

2. At Cincinnati the merger between the Medical College of Ohio and the Miami Medical College has been completed, the new school to be the Medical Department of the University of Cincinnati. The building of an enormous new city hospital has already been started near the university campus and a new medical college building will be erected adjoining this hospital. The outlook for this new school is very encouraging.

3. The Keokuk Medical College, College of Physicians and Surgeons, located at Keokuk, Iowa, has turned all its property and good will over to the Drake University, College of Medicine, at Des Moines, Iowa.

4. The University of Southern California, College of Medicine, at Los Angeles, has united with the University of California, whereby it becomes the Los Angeles Medical Department of the State University. The work of the first two years will be at Berkeley, the student being allowed to take his clinical work either at San Francisco or Los Angeles.

5. The Cooper Medical College, beginning this fall, will be the Medical Department of Leland Stanford, Jr., University, located at Palo Alto, Cal. Three years of work in the liberal arts department will be required for admission. The first three semesters of medical work will be given on the University campus at Palo Alto, the last five at San Francisco.

QUALITY VERSUS QUANTITY

Five years ago there were 166 medical colleges in the United States. Since that time 25 others have been organized, but 43 were closed, leaving 148 at the present time. Of those closed, 16 became extinct and the balance merged into others. That the medical colleges themselves realize the need of improvement in standards and equipment is best shown by the fact that in five years mergers took place replacing 34 medical colleges by 12, which were invariably larger, stronger and better equipped.

There are numerous other cities where mergers might be brought about if those interested in general education and those in medical education in each city would work together to secure them. For example, if all the medical colleges of any large city, such as Chicago, Philadelphia, St. Louis or others could be merged into one great university medical school, such as are to be found in Berlin, Paris or Vienna, it would be of the greatest possible advantage to medical education in this country.

NIGHT TEACHING ABANDONED

Information has been received that the teaching of medicine to students attending only at night or after 4 o'clock p. m., has been abandoned by George Washington University and by Howard University, both located at Washington, D. C., and by Temple College Medical School at Philadelphia. This still leaves four medical night schools, three of which are at Chicago and one at St. Louis.

GRANTING OF ADVANCED STANDING

It is a rather deplorable practice, even with some of the supposedly better grade medical colleges, to allow advanced standing with little or no restrictions for work done in some of the medical schools known to be extremely low grade, from night schools and even from schools not generally recognized by law as medical schools. It is quite encouraging, therefore, to note that an increasing number of colleges are limiting advanced standing to credentials from colleges of known merit.

NEEDS AS REVEALED BY THE INVESTIGATION OF MEDICAL COLLEGES

An investigation of medical education in the United States covering a period of five years and which included one or more personal inspections of each individual medical school, has revealed numerous defects in the teaching of medicine, some of which may be briefly stated as follows:

1. There are too many medical colleges in this country. As shown in our report last year, the United States has nearly as many colleges as the rest of the civilized world combined. The majority of them depend on the fees of students to pay their running expenses.

2. This has led to an active competition for students and to a disregard of preliminary requirements which has not only prevented the medical school from obtaining well-trained students, but has also hindered the development of high schools, since students were and are still being admitted with only a grammar school education.

3. The methods of teaching medicine of 15 or 20 years ago are still being followed by a number of our colleges, and the students in many of the schools are not required to have a preliminary training the equivalent of a four-year high school education.

4. The medicine of to-day, however, really demands of the student a more extensive and thorough preliminary training than is possible in the vast majority of our secondary schools. Experience has shown that this additional preliminary training for medicine should consist of at least one year's work in physics, chemistry and biology, and that a reading knowledge of German and French should also be required.

5. The teaching of medicine to-day demands trained teachers. For the fundamental medical sciences there should be instructors who have had special, thorough training in anatomy, histology and embryology, physiology, physiologic chemistry, pharmacology, pathology and bacteriology, and these men should be paid salaries sufficient to permit them to devote their entire time to teaching and research, unhampered by the necessity of keeping up an active practice for a livelihood.

6. In order to properly teach medicine, medical colleges must have hospitals either owned by them or entirely under their control so far as the clinical material is concerned. This is now one of the greatest needs of medical teaching. Our medical students must come into closer contact with patients in hospital wards and dispensaries, where they should be given a systematic, careful training in writing histories and in the methods of the clinical laboratory.

7. If the medical college is of high standard, hospital patients would be benefited by the presence of students. The attending physician will be more careful in his examinations and treatment if he is teaching medical students. The trustees of hospitals should have pointed out to them the importance of the educational function of the hospital and the value of a medical school connection.

8. In many instances our medical schools are run as medical "institutions," manned by busy practitioners for whom the college work is an insignificant side-issue, rather than as medical colleges in the hands of teachers, for whom the practice of medicine is no consideration except for those connected with the clinical chairs. Even the occupants of the clinical chairs should be selected for their ability as teachers rather than because of their practice, or because they are on the attending staff of this or that hospital.

9. Another serious need is proper supervision, since a number of medical colleges have an abundance of clinical material, but for want of proper oversight are not taking advantage of it. A smaller amount of material carefully used is sometimes better than a large amount of material without careful supervision, since in the latter case the student is apt to develop superficial habits.

10. This supervision should also extend to keeping the buildings clean. The uncleanliness of the buildings and laboratories of some of our medical colleges makes one question the possibility of their teaching asepsis, or even ordinary cleanliness.

11. A number of medical schools have not yet adopted the recent methods of embalming anatomic material by which the work of dissection is much more agreeable. A larger number have not provided frozen cross-sections, prepared anatomic specimens, or other modern adjuncts which are so useful in the teaching of anatomy.

12. Medical Education is but one of the departments of our general system of education, and should be brought into harmony with all other departments. The interests of all departments of education are mutual. What helps one should help all. Medical schools must depend on the high schools, colleges and universities to furnish the preliminary training for medical students. The medical school might also obtain many valuable suggestions from the liberal arts colleges in regard to supervision, standards of equipment and methods of teaching. On the other hand, if the medical college insists on high standards of preliminary education, it will aid and stimulate the work of the secondary schools, colleges and universities.

13. Owing to the confusion in the standards of secondary schools, it requires expert knowledge to place the proper value

on preliminary credentials and to judge of a student's qualifications, which information is not at present available for medical schools. The provision for certificates from county superintendents or high school principals has proved to be very unsatisfactory. A number of eastern colleges and universities have solved the problem by requiring that their examinations be held by the College Entrance Examining Board. It might be possible to have preliminary credentials of medical students pass through the hands of that board.

14. There are a number of medical schools known as medical departments of universities which in point of fact have only nominal connection with such universities. In a few instances there is no real university of the name given, or else the university is made up of schools of medicine, law, dentistry and pharmacy without a liberal arts department. The majority of these are really independent medical schools, the university so called having no control over the standards of teaching, nor furnishing any financial assistance to its "medical department."

15. A medical school would be greatly benefited by becoming the organic medical department of a university which has a strong liberal arts department. By "organic" is meant where the medical school and its finances are controlled by the university trustees and where the educational standards are fixed by the liberal arts department. By such connections, made within recent years, it has been most interesting to watch the transformation of what might better be termed "medical institutions" into, what are in every sense of the term, "medical colleges."

16. Those medical schools which are honestly striving to teach medicine and which have the right ideals should receive endowment. It has been clearly demonstrated time and again that no medical school can demand the necessary entrance requirements, provide the expert all-time salaried instructors, install the thoroughly equipped laboratories and properly supervise the dispensary and hospital teaching without private endowment or state aid. Additional figures have been received during the past year showing that the cost of teaching a student in each of the freshman and sophomore years in the 25 or 30 leading medical schools ranges from $250 to $700 or more per year, while the tuition received from each student ranges only from $65 to $250 per year. To meet the necessary expenses of properly teaching medicine from students' fees is therefore clearly out of the question.

17. After all that has been said in the last four or five years regarding the needs of modern medicine in money, salaried instructors, laboratories and hospitals, there are still a considerable number of colleges which, from students' fees, are able to pay all expenses and still have a snug little sum at the end of the year to "divide up" among the members of the faculty. And strange as it may seem, it is from these very colleges that we oftenest hear the plea for "the poor boy who wants to get an education" as an excuse for low preliminary requirements, and the question as to "who will practice at the country cross-roads and the back-woods districts" if a thorough medical training is insisted on.

18. There are several medical schools so called which are little else than quiz classes and which are run only to prepare their students to pass state license examinations. Inspection shows they seriously lack equipment or make little use of what they have. Statistics show that "graduates" of these schools are able to pass state license examinations, as they are now generally conducted. This is an argument for the practical state license examination.

STATE LICENSE LEGISLATION AND REQUIREMENTS

Since a year ago several important changes have been made in medical practice acts or in board rulings governing the requirements for license to practice medicine.

PRACTICAL EXAMINATIONS

1. Three state boards, those of Colorado, Massachusetts and Ohio, included practical tests in the examination of applicants for license. These tests included the making of urinalyses and the identification under the microscope of histologic, pathologic and bacterial specimens. Two other boards, those of Indiana and Minnesota, have announced that practical tests will hereafter be required.

2. In three states, Alabama, Arkansas and Rhode Island, amendments to the practice acts have been secured requiring that all applicants for license be graduates of reputable medical colleges. This leaves only three states, Massachusetts, Mississippi and Tennessee, which still allow non-graduates to secure licenses other than through reciprocity.

3. Indiana, Iowa and Nebraska have provided for examinations in two parts whereby the fundamental medical branches may be passed off at the end of the sophomore year, this credit to be accepted toward the examination for license after the student has graduated. There are now eight states having this two-part examination, as follows:

Colorado,	Maryland,	New York,
Indiana,	Michigan,	Virginia.
Iowa,	Nebraska.	

4. In only one instance during the past four years has a state retrograded in its standards for medical licensure. This occurred during the last year in Oklahoma. A bill for a strong practice act was introduced, but was so sadly riddled by the time it came through the Oklahoma legislature that it provides lower standards than were formerly enforced in the territory of Oklahoma.

5. In four states during the past year recognition was withdrawn from a number of medical colleges. In Indiana from one college which has been closed, in Illinois from five, to all of which recognition has since been restored, in Missouri from two, to one of which recognition has been restored, and in Texas from two, both of which have been closed. In several other states, while recognition was not withdrawn from colleges, considerable pressure has been exerted by the boards resulting in marked changes for the better.

PROGRESS TOWARD UNIFORMITY IN FIVE YEARS

In the past five years the many changes in practice acts show that the requirements to practice medicine in the various

states are approaching uniformity by the process of evolution. These changes are as follows:

1. Then only 20 state practice acts made provision for preliminary education; now 36 have such provision. Then no states provided for collegiate education; now six require one or two years of college work as the minimum preliminary requirement. Then only 10 had a 4-year high school requirement; now 22 have that requirement.

2. Then 43 states required an examination of all applicants for license; now all but one state have that requirement. New Mexico still registers graduates from certain medical colleges without the written examination.

3. Then 38 states required that all applicants must be graduates of reputable medical colleges; now all but three have that requirement.

4. Then only about 14 states had full authority to refuse recognition to colleges of low grade; now 29 state boards have full authority and 10 others have limited authority, while only 10 remain without such control.

5. Then all but 13 states had single boards of medical examiners; now only 10 states still have sectarian boards.

6. Then 22 states did not have reciprocal relations with others; now all but 14 states have such reciprocal relations, while two others have legal provision for it.

In the work of bettering medical education in this country, however, there are some other important problems to which attention should be drawn.

CHARTERING OF COLLEGES

In only a few states is there any check on the incorporation or chartering of medical schools. In most states any body of men by paying the required fee can incorporate as a college or university, often with authority to grant any degree under the sun, no question being asked as to the ability to furnish education of the standard generally supplied by the better colleges and universities. And seldom is there any means of control over such institutions, even after they are incorporated.

PSEUDO-MEDICAL COLLEGES

No such unchecked educational institutions are allowed to exist in any other country and, so far as we have been able to learn, in no other country are to be found so many medical sects, or pseudo-medical institutions. There are now some 30 or more nondescript medical fads in a long procession demanding legal recognition, separate boards or representation on examining boards. In some instances the influence has been seriously demoralizing.

SPECIAL LEGISLATION

The chief difficulty in the proper regulation of the practice of medicine in some of the states is the inconsistency of medical legislation. In several instances good, strong medical-practice laws have been enacted providing for fair standards of education but which have been practically annulled by special legislation granting to this or that medical sect special standards, or special boards or representation on examining boards.

THE LOGICAL PROCEDURE

No one should be permitted to practice medicine who is not sufficiently trained to recognize disease, since a proper diagnosis is essential for any treatment regardless of the methods employed. The only logical position to take in the matter is, as has been done in a few states, to fix an educational standard by which all who wish to secure the license to practice medicine must comply. This standard should require a fair amount of preliminary education, which should be at least that of a four-year high school course, and a thorough training of at least four years in a medical school, the first two years of which should be devoted largely to laboratory courses in the fundamental medical sciences, anatomy, physiology, pharmacology, pathology and the like, a knowledge of which is absolutely essential to one who is to differentiate between health and disease. The last two years should be largely spent in the hospital and dispensary, in personal contact with the sick and injured, and should include a thorough training in the clinical laboratory. If this standard is complied with and the examination is passed, then grant a physician's license and let the holder practice as his educated common sense dictates.

RECIPROCITY

Reciprocity, if wisely administered, is a commendable measure and a matter of justice to the old practitioner, who for good reason may be compelled to move to another state. Misunderstood, however, or poorly administered, it may seriously lower medical standards. It is still quite widely understood, even by some state board members, that if one state has reciprocity with another it means that any doctor licensed by the one state must be accepted by the other, no matter how low the applicant's preliminary training was or from what college he may have graduated. Of course, that idea is entirely wrong, since reciprocity provides that the license from another state may be accepted in lieu only of the written examination. In all other respects the applicant should comply with the standard required by the law of the state in which he is trying to secure license, which standards it is the duty of the licensing board to enforce.

As usually provided in the state practice acts, reciprocity is a discretionary measure, licenses under that measure to be granted only when the board is satisfied that the applicant in every way comes up to the standard fixed by the practice act. It sometimes occurs that an applicant who has failed repeatedly before one board goes elsewhere and passes, then reapplies to the first board for a license through reciprocity. Several boards under such circumstances have very properly refused to issue licenses, and have demanded that such applicants pass their own examinations. Another board, that of Louisiana, has recently published a list of medical colleges which are considered satisfactory, and has barred graduates of all other schools from registration through reciprocity. Such procedure by the boards makes reciprocity in their hands a powerful influence for higher standards.

ADVANCES OF THE PAST YEAR

From the several advances mentioned, and doubtless others should be included, it will be seen that improvements in medical education in this country are being rapidly brought about. The following sentences will briefly indicate some of the advances made during the past year:

(a) Several state legislatures have made large appropriations for the opening of good high schools, and several organizations are actively working for the standardization of our secondary schools, colleges and universities.

(b) Twenty-nine medical schools by 1910 will be requiring two or more years of liberal arts' college work for admission.

(c) At least 50 medical schools by 1910 will be requiring one or more years of liberal arts' college work for admission.

(d) Practically all of the medical schools referred to expect to require preliminary work in college physics, chemistry and biology, and a reading knowledge of German or French.

(e) Six State Medical Examining Boards have increased their requirements of preliminary education to one or two years of work in a college of liberal arts.

(f) Five important mergers have been completed during the year, replacing nine medical colleges by four stronger ones.

(g) Teaching medicine at night has been abandoned by three medical schools, and only four remain, three of these being at Chicago and one at St. Louis.

(h) Practical examinations in addition to the written have been inaugurated by three examining boards; those of Colorado, Ohio and Massachusetts. Minnesota and Indiana have decided to require them hereafter.

(i) One more state now requires that all applicants be graduates in medicine, leaving only five which license non-graduates.

(j) Six state boards have provided for a two-part examination, whereby applicants may take examinations in some of the subjects at the end of their sophomore year.

LOOKING AHEAD

While much remains to be accomplished, many of the problems are now more clearly defined and rapidly approaching a satisfactory solution. Several strong forces are at work at these problems, including the state examining boards and their confederations, the medical colleges and their associations, the American Academy of Medicine and others. Each organization is doing a work which can not be done by the others. Sometimes the efforts overlap, but should not be allowed to conflict. There is certainly enough work for all, and they are all striving toward the same ideal, namely, the improvement of medical standards in the United States, until they are at least equal to those of our neighbors, across the Atlantic.

Respectfully submitted,

N. P. Colwell, Secretary.

Report on Medical Curriculum

DR. BEVAN: I would like to make a brief statement in regard to the medical curriculum which is now to be reported. The entire subject of medicine was divided into ten parts, a chairman for each part appointed, and with the chairman nine other members were selected for each section, thus providing one hundred men specially qualified in their different departments to develop a medical curriculum. This medical curriculum to be reported to-day is regarded by the Council as educational and suggestive, and is not advanced as a hard and fast requirement. In order that there should be no misunderstanding on this point, the following resolution was unanimously adopted:

WHEREAS, The object of the Council on Medical Education in appointing this committee on curriculum was that such a curriculum should be entirely educational and suggestive; and

WHEREAS, The impression prevails among medical teachers and members of state medical examining boards that the curriculum is being framed for the purpose of having it serve as a standard to which medical colleges must conform, or be condemned by the state authorities as not in good standing, therefore, be it

Resolved, That every publication of any curriculum hereafter to be made by the Council, its members, or its officers as such, shall state explicitly that the Council does not consider it in the interests of true progress in education that any standard curriculum whatever shall be uniformly adopted by all medical colleges.

Let me say also that the Council endorses the wish of the Committees on Pharmacology, Toxicology, Therapeutics and Medicine, namely, that State Boards cooperate in the effort for more thorough and sound instruction by confining their requirements in these subjects to the important and commonly used drugs and preparations and by avoiding in their examinations questions on drugs which are but rarely used, or which are of doubtful value.

WORK FOR A STANDARD CURRICULUM IN MEDICAL COLLEGES

The following constitutes the personnel of the committee:

SECTION 1.—ANATOMY, INCLUDING HISTOLOGY AND EMBRYOLOGY

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Medical Curriculum

The following gives the complete schedule of hours in the various subdivisions of the medical curriculum as given in the reports of the ten subcommittees. At a meeting of the ten chairmen the totals for each department by vote were reduced to the figures given in the third column.

Subject and Subdivision.	Hours.	Original Total.	Reduced Total.
I. Anatomy	...	760	700
Dissection	370		
Histology	140		
Neurology	90		
Embryology	90		
Topographical Anatomy	70		
II. Physiology, Organic and Physiological Chemistry	...	550	530
Organic Chemistry	80		
Physiological Chemistry	200		
Physiology	270		
III. Pathology and Bacteriology	...	500	500
Bacteriology (approximately)	200		
Pathology	300		
IV. Pharmacology, Toxicology and Therapeutics	...	260	240
Pharmacy, Chemical Toxicology and Elemental Prescription Writing	35		
Experimental Pharmaco-Dynamics	60		
Systematic Pharmacology and Prescription Writing	72		
Non-Pharmacal Therapeutics	16		
General Therapeutics and Prescription Writing	45		
Therapeutic Clinics and Prescription Writing	32		
V. Medicine	...	885	890
Physical Diagnosis, Normal	45		
Lectures or Recitations	90		
Diagnostic Clinics (Observation Classes)	30		
Clinical Pathology	60		
Ward Classes, Diagnosis (Junior)	30		
Pediatrics (Junior)	100		
Neurology (Junior)	60		
Didactic, or Recitation, or Case Method	30		
Ward and Laboratory (Senior)	180		
Clinic and Clinical Conference	60		
Out-Patient Clinics	30		
Neurology	90		
Pediatrics	80		
VI. Surgery	...	680	650
Bandaging and Practice Dressing	30		
Surgical Pathology	60		

Subject and Subdivision.	Hours.	Original Total.	Reduced Total.
Surgical Anatomy	30		
Principles of Surgery	210		
Minor Surgery	60		
Regional Surgery	150		
Operative Surgery	50		
Orthopedic Surgery	45		
Genito-Urinary Surgery	45		
VII. Obstetrics and Gynecology	...	300	240
Obstetrical Lectures, Recitations, Manikin Work, etc.	120		
Obstetrical Clinical Work (Dispensary, Hospital and Laboratory)	30	180	
Amphitheater Clinics	30		
Gynecology Lectures and Recitations	60		
Gynecology Dispensary Clinics, "Touch Course"	30	120	
Gynecology Amphitheater Clinics	30		
VIII. Diseases of Eye, Ear, Nose and Throat	...	140	140
Eye—Didactic (Entire Class)	15		
Eye—Clinics (Hospital and Dispensary)	15	50	
Eye—Section Work (Dispensary and Hospital)	20		
Ear—Didactic	20	40	
Ear—Clinical	20		
Nose and Throat—Theoretical	20	50	
Nose and Throat—Practical	30		
IX. Dermatology and Syphilis	...	90	90
X. Hygiene and Medical Jurisprudence	...	305	120
1. Public Health and Hygiene—			
The Legal Mechanism for the Control of Disease, Federal State and Municipal	12		
Vital Statistics	4		
Transmissible Diseases and Their Epidemiology	60		
Occupational Diseases, not including infections	10		
Milk Supply in Relation to Disease	10		
Food Supply, Meat Inspection, etc.	10		
Water Supply and Sewage Disposal	20		
Sanitary Engineering and Architecture, including Plumbing, Ventilation, Hospital, School, Dwelling, and Public Sanitation, etc.	3		
Social Economics—Economic Cost of Disease	10		
Publicity in Relation to Public Health	...		
Disinfection	10		
Sanitation of Travel	5		
Inspection of Hotels and Restaurants in Relation to Cleanliness, Sanitary Facilities, etc., and also Medical Inspection of Those Who Handle Food, Water, etc.	2		
School Hygiene	10		
Hygiene of Public Institutions, for the Insane, Feeble-Minded, Deaf, Dumb, Blind and Correctional Institutions	30		
Eugenics	...		
Hygiene of Venereal Diseases. (Course to be provided and coordinates by subcommittee)	...		

Sanitary Aspects of Embalming, Funeral Direction and the Transportation of the Dead. (Course to be provided and coordinated by subcommittees.)	...		
Naval and Military Hygiene. (Course to be provided and coordinated by subcommittees.)	...		
Tropical Medicine. (Course to be provided and coordinated by subcommittees.)	...		
Personal Hygiene. (Time will vary according to amount of time chargeable to other subcommittees.)	28		
2. Medical Jurisprudence. (Time will vary according to amount of time chargeable to other subcommittees.)	60		
3. Medical Ethics, Publicity, Economics, Organization, Relationship, etc.	10		
Grand total		4,470	4,100

SECTION I.—REPORT OF THE SUBCOMMITTEE ON ANATOMY

I. INTRODUCTION

The aim of medical education is to develop the capacity to solve the problems presented by disease. The value of anatomy in medical education depends on the part which it plays in developing this capacity. As the oldest, the most thoroughly developed and the most concrete of the basal sciences on which human medicine is based practical, gross human anatomy has long been held the most important of the fundamental subjects of the medical curriculum. Of late years the development of practical laboratory courses in physiology, chemistry, bacteriology, pathology and pharmacology and of practical clinical courses has served to decrease the relative importance of gross human anatomy, but, on the other hand, the development of microscopic anatomy, of embryology and of neurology has meanwhile served to increase the value of anatomic science in medical training. All other branches specifically designed to train the student for the study of medicine are based to a greater or less degree on the anatomic sciences. Physiology to a considerable extent is based on deductions from structural peculiarities. Chemistry as applied to medicine has to take organic structure into account, and in the ideal ultimate development of the sciences chemical structure should be brought into harmony with visible anatomic structure. Pathology has constantly to refer to normal structure as a basis for comparison. Applied anatomy is an important part of every field of practical medicine. Until preventive medicine shall render needless the treatment of individual human beings, anatomy will hold its own as the most fundamental branch in medical education. Attempts unduely to curtail it will merely serve to weaken the whole edifice.

Like most good things which have come down to us from the distant past, gross human anatomy is laden with tradi-

tions, some of which could be given up with benefit to all. Many have already been given up. The tedious demonstration lecture which has come down from the times when books were too scarce and dear for the students and anatomic material too difficult to be freely furnished, has largely given way to improved laboratory facilities, atlases and guides. The traditional need for learning an immense amount of text-book detail by heart, as if one were to practice medicine with books debarred, is soon to give way to a more rational conception of anatomic study. Our impractical state board examinations are the most serious present obstacle to this. Neat and careful, thoughtful dissection of a small amount of well-preserved material has in all the better laboratories taken the place of the hurried,careless dissection of many bodies. In the future, it seems probable, much less time will be spent in teaching the minutiæ of the gross anatomy of the bones, muscles, blood vessels and nerves, but more time in laboratory study of the central nervous system, the organs of special sense and the viscera and more time on microscopic anatomy and embryology.

Adequate time for anatomy is the more important because it is the subject which has to bear the brunt of introducing students into intelligent study of medical science. Its concreteness and the refinements of its technic, combined with abundance of laboratory material and the ease with which it may be furnished at any time, render it particularly fitted for this purpose. As an introductory discipline it should share the field with physiologic chemistry, since medical science rests primarily on anatomic and chemical and to a much less extent on physical methods. About two-thirds of the first year, it would seem, may justly be given up to anatomy and one-third to physiologic chemistry, including with the latter, perhaps, an introductory course in organic chemistry.

The anatomy of this first year should be taken up so far as possible from the physiologic standpoint. Embryologic studies should give an insight into the physiology of growth. Study of the skeleton, muscles and joints should be correlated with a study of the simpler mechanics of motion. In the study of the viscera and the nervous system the physiologic aspects should be kept to the fore. A groundwork for the more technical aspects of physiology may thus be gained.

The majority of the committee on anatomy believe that the number of hours specifically devoted to the various subjects of the medical curriculum should be kept at a minimum and would prefer a curriculum of 3,600 to one of 4,000 hours definitely assigned. In addition to the required courses in each department, there should be abundant facilities for advanced work. Thus opportunity would be given the student to devote himself heart and soul to one or two branches during his medical course. It is safe to say that his subsequent success as a practitioner will depend more on the work he does in these one or two branches than in all his required work combined. If one looks back to the days when he was in school, he will find that the work he did there that has since really counted in his life was the work he did with enthusiasm

in great excess of the established routine. Our own students should be given the same opportunities.

Each patient presents a biologic problem which the physician is called on to solve. The independent solution of problems becomes thus a fundamental necessity of a proper medical education. It is only in advanced courses, and especially in research, that the faculties for this become fully developed. We must readopt the practice established in our first medical schools, but given up when medical education began to decline in this country, the practice of requiring a thesis showing on the part of the student some independent mastery of some branch of medical science.

In the old days the twice repeated three months' lecture course had at least the advantage that it left the good man nine months each year in which to perfect himself by independent study. The better men made good under the system. Recently we have been rapidly tending in medical education toward the Chinese educational methods in which every lesson that must be learned is so carefully mapped out that the patient fellow willing to go through it for the sake of public service is well on in life and without intellectual ambitions by the time he does get through.

What we should aim at is not a fixed curriculum. We should aim primarily at improving facilities for study and the quality of the teachers in our schools. Believing this to be the case, the chief emphasis in the following report has been placed on teaching and equipment. An apology is perhaps due for too detailed an account of certain parts of the equipment found in the better schools. These details, trivial and self-evident to the professional anatomist, are given not for his sake, but to aid those who have to obtain facilities from administrators not familiar with the modern demands of an anatomical laboratory.

II. ANSWERS TO QUESTIONS ASKED BY THE COUNCIL

A. Essential Prerequisites for the Anatomic Sciences of the Medical Course

Required preliminary work of college grade in physics, chemistry, biology and modern languages is of special advantage to anatomy. Anatomy comes at the beginning of a student's course in a medical school, and unless the student has an adequate preliminary training he must first learn how to work before he can begin to make headway in the science. The well-prepared student can do more intelligent work a few weeks after he enters the course than most ill-prepared students can toward the end of the course. The latter are apt to become lost in a maze of detail from which they can derive no meaning. Two years of preliminary college work are far preferable to one year.

Of the preliminary courses the one most directly important for anatomy is a laboratory course of college grade in biology. A well-equipped laboratory is essential for an adequate course. There should be facilities for keeping living plants and animals of various types and the equipment should include an outfit for the teaching of microscopic as well as the

gross anatomy of plants and animals. While the course should include some training in botany, the main stress should be laid on zoology. Courses in comparative anatomy and in comparative embryology are advisable, but not necessary. The dissection of a mammal is helpful to the student. The physiologic as well as the morphologic aspects of plants and animals should be emphasized. If the student studies the structure of the lower animals with special reference to their activities he will subsequently find it the easier to take up the study of human structure from the standpoint of function, the standpoint of greatest importance to the physician.

B. The Place of the Anatomic Sciences in the Medical Curriculum

The first half of the first year of the medical curriculum should be devoted chiefly to gross anatomy and to histology. These subjects should, so far as possible, be coordinated. In the second half year histology may be followed by neurology and embryology. Gross anatomy may be continued throughout the second half of the first year or may be taken up again in the first half of the second year. Topographic and applied anatomy may be taught in the second and subsequent years of the course. The majority of the committee believe that the required osteology, dissection, histology, neurology, and embryology should be completed during the first quired. Courses in embryology, neurology and topographic ical and applied anatomy.

C. Required and Elective Subjects

Courses in gross anatomy and histology should be required. Courses in embryology, neurology and topographical anatomy may be made elective in an elastic curriculum but should constitute a specific part of a 4,000-hour defined curriculum. If courses in embryology, topographic anatomy and neurology are not required, the elements of these subjects should be included in the courses in histology and gross anatomy. Various advanced and special courses may be offered as electives. It is certain that no department of anatomy can meet the minimum requirements of medical students if it is not prepared to give much more than minimum opportunities for meeting these requirements.

When the medical school is fortunate enough to be a real or integral part of a university, the anatomic department or institute may well provide not only courses for medical students, but also pre-medical courses in comparative anatomy and advanced courses for zoologists, and the work of the university in vertebrate anatomy may be concentrated in this department. Such a department should be centrally connected with the medical school, but should have close affiliations with other colleges and departments. Concentration of this kind adds both to economy and efficiency.

The work offered may comprise courses in:

(a) Comparative vertebrate anatomy.

(b) Human and comparative osteology, including special provision for courses for dental students and for students of anthropology and paleontology.

(c) Dissections and systemic human anatomy.

(d) Topographic anatomy.

(e) Anatomy as applied in medicine, surgery and the specialties.

(f) Microscopic anatomy and histology, human and comparative.

(g) Embryology, human, comparative and experimental.

(h) Neurology, human, comparative and experimental.

(i) Anatomic technic: (1) Gross, including injections, corrosions, etc.; (2) general microtechnic; (3) special technic (blood, etc.); (4) illustrative work, including drawings, reconstruction methods, etc.

(j) Investigation of anatomic problems, including methods of looking up the literature on a subject.

(k) History of the development of the anatomic sciences.

(l) Artistic anatomy.

While an "ideal" anatomic institute with a director and provision for all the branches mentioned is desirable, it is not essential for the teaching of anatomy in a medical school. It is, however, essential that the courses in gross anatomy should be closely co-ordinated on the one hand with those in microscopic anatomy and embryology, and on the other hand with topographical and applied anatomy. It is also essential that in addition to the work required of every student, there should be elective courses and opportunity for advanced work.

D. Qualifications of Instructors

The supervision of work in a department of anatomy in a medical school should be in charge of persons who have had a thorough professional training in the various branches of anatomy and who have demonstrated ability in teaching and research. They should have acquaintance with anatomy as applied to medicine and surgery. They should devote their entire time to teaching and investigation, and should be provided with ample time and facilities for doing both. The traditional bad name for dulness which anatomy has borne among medical students in this country has been largely due to the fact that it has too often been taught by men who have known it only as a dead science. Unless the teacher is playing at least a small part in the growth of the science he is teaching, he is not likely to have an intimate acquaintance with its more vital aspects. The teacher should therefore have opportunity to devote himself to investigation. On the other hand, it is important that teaching in the main fundamental courses, and especially the laboratory work, including dissection, be directly in charge of the leading members of the staff and not entrusted to inexperienced assistants. In addition to the professor in charge, there should in general be enough instructors and assistants to provide one for each twelve to fifteen students in a laboratory course. A strong leader may get along with a smaller number of assistants, but an adequate teaching force is essential for thorough efficient work. The shortening of the time devoted to anatomy, which the development of other laboratory courses involves, necessitates an increased number of instructors in order that there may be no time wasted on the part of the student.

While the fundamental work should be directly in charge of the leading members of the staff, many of the elective courses can be put into the hands of less experienced instructors. It is desirable that each instructor give an independent course of this nature, since it serves to show his capacity, and it aids his development as a teacher. If successful, a young teacher may inspire much wholesome enthusiasm in his students.

Courses in applied anatomy may be taught by competent clinicians, but should be taught by them in the anatomic department.

E. Methods of Instruction

The chief essential is the able instructor, professionally trained in anatomy. Various methods of instruction will yield good results when employed by capable teachers. Courses should be arranged so that the student may concentrate the greater part of his energies on the anatomical sciences during the period when he is mastering the essential principles of human anatomy. This so-called "concentration method" was urged half a century ago by von Baer and has since been recommended by several of the greatest teachers of anatomy, including Waldeyer (see Mall, "On the Teaching of Anatomy," Anatomical Record, 1908).

The major part of courses in the anatomic sciences should be the laboratory work. Abundance of good material is necessary. The equipment may be simple but should be adequate. The professor, not the untrained assistant, should be in charge. Lectures and quizzes may be utilized according to the pedagogical ideals of the instructor, but should be ancillary to the laboratory work. The student, however, should not be allowed to content himself with mere mechanical laboratory work and with committing details to memory. He should get some understanding of general principles, some insight into methods of classification, some idea of the development of anatomy as a science and some knowledge of the relations of the science to medicine. He should gain concrete ideas of structure so as to become able to "think anatomically." He should be made to feel that he is studying an intricate and delicate mechanism which subsequently he will be called on to set right when it gets out of gear. To do this he must gain a thorough understanding of biological mechanism in general and of the human mechanism in particular.

Careful, thoughtful dissection of the human body is the chief essential of the work in gross anatomy. Atlases and text-books should be kept close at hand by each student and he should frequently turn to these for information and guidance. In most of the better American anatomic laboratories the method of coordinate systemic dissection is adopted. The skin is first removed and then the superficial fascia. In the latter the superficial nerves and blood vessels are carefully studied. In the dissection of the deeper parts the vascular and peripheral nervous systems are worked out in conjunction with the organs to which they are distributed. While fat and areolar tissue are removed freely the attempt is made to keep the more definitive structures in as near their natural relations as possible. The text-book, models, special preparations and charts, recitations and the final study of the dis-

sected part are relied on to give the student a clear conception of each of the great organ systems. A brief study of osteology may precede dissection, but during dissection the student is constantly referred to the skeleton as a topographic basis and thus he becomes better and better acquainted with it. At the end of the dissection the soft parts are removed and the articulated skeleton is studied. Reference to frozen sections during the course of the dissection is a great aid in emphasizing structural relations.

In the course in microscopic anatomy it is usual to study a fairly extensive series of microscopic sections from the chief organs of the human body. In addition to this, in the better laboratories, fine dissection of fresh and hardened tissues and organs, under low as well as high magnification, forms an important part of the work. The aim is made to co-ordinate carefully the structure revealed by the microscope with the gross anatomic structure of tissues, organs and systems. The dissection of a small mammal or an embryo may be utilized to co-ordinate the various organs and systems with the body as a whole. The elements of microscopic technic should be taught, but the students' time should not be wasted by too great a devotion to routine mechanical procedures.

In embryology the work may begin with a study of the general processes of vertebrate development as illustrated by the eggs of the frog and the chick. For medical students, however, a relatively large part of the course should be devoted to organ differentiation and histogenesis in mammals and man.

In neurology careful dissection of the formalin hardened human brain and cord should be associated with the study of a good series of microscopic sections of the central nervous system. The embryology of the central nervous system forms a good introduction. Study of the organs of special sense may form a part of the course in neurology. Dissection of the organs of special sense of the adult or of mammalian embryos advanced in development makes a useful addition to the study of sections of the organs.

In topographiic anatomy cross sections and special preparations of formalin hardened bodies should occupy the chief attention of the students. Regional anatomy studied on the living model adds much to the interest of such a course.

Drawing is a valuable aid in stimulating the attention and sharpening the powers of observation of students of anatomy. It is commonly required in courses in microscopic anatomy. Simple semi-diagrammatic drawings if accurate are equally valuable requirements for courses in gross anatomy. Elaborate drawings, on the other hand, are apt to involve too much thoughtless expenditure of time in mere mechanical procedures. Clay modeling is found by some teachers of much value, especially in the study of osteology. It is apt, however, to involve the risk mentioned in connection with elaborate drawings.

F. Necessary Laboratory Equipment

Under equipment for the department of anatomy are included: (a) Quarters, (b) furniture, apparatus and supplies, (c) models and charts, (d) special preparations and (e) library.

A. QUARTERS

Ample space should be provided for practical work in gross human and microscopic anatomy. There should be a lecture room, rooms for the members of the staff, for advanced work, for museum and library. Good toilet and dressing rooms should be provided. We may specify in more detail certain of these requirements.

1. Gross human anatomy. Enough laboratory space should be provided to enable the student to do careful dissecting. Arrangements should be made to prevent disturbance of a dissection during periods when the dissector is not in the room. The rooms should be finished, furnished and cared for in a manner to inspire a sense of refinement in the student. A series of small dissecting rooms, accommodating from one to three or four dissecting tables, is now preferred by many instructors to a single large dissecting room. Quiet, orderly work is thus much fostered. The dissecting room should be provided with hot and cold running water and be furnished with locker space in which the students can put their apparatus, books, and dissecting room clothing at the end of the day's work. It is desirable, if possible, that these lockers be places adjacent to, but not in, the dissecting room itself. The dissecting rooms should be well lighted, both by sunlight and by artificial light.

There should be rooms for the preparation and preservation of cadavers, and for maceration and cremation of dissected parts.

A valuable adjunct to the dissecting rooms is a study room in which special preparations, models, etc., are kept. Such a study room should be of ample size for accommodating a class in topographic anatomy.

2. For microscopic anatomy and embryology well-lighted laboratory space should be provided. It is desirable, but not absolutely essential, that the major part of the light come from the north. The laboratory should be sufficiently large to provide well-lighted space for all students in it at any given time. The work in microscopic anatomy and embryology lends itself more readily than gross human anatomy to teaching classes in sections which in turn use the same laboratory.

A study room in which a reference collection of microscopic specimens, special preparations and models are kept is a valuable adjunct to the general laboratories for microscopic anatomy and embryology.

In connection with these laboratories there should be a room in which the material for the class is prepared. Such a room should be well lighted, be provided with gas and hot and cold water and a good equipment for microscopic technic.

3. If desired lectures in anatomy may be given in the laboratories so that a special lecture room is not absolutely essential. It is, however, a convenient adjunct. The seats should

be so arranged that demonstrations may be readily observed from any part of the room.

4. The members of the staff should be provided with private quarters suitable not only for office work, but also for carrying on scientific investigation. Other rooms in which advanced work in anatomy and research can be carried on are a valuable adjunct. The preparation rooms can, however, be utilized for advanced students. A micro-photographic dark room is of great value. This should be provided with a micro-photographic outfit, a camera and a lense for enlarging, making lantern slides and photographing gross specimens.

5. In addition to the working collections provided for in the study rooms mentioned above, a large museum containing preparations illustrating human and comparative anatomy is a valuable adjunct to an anatomic department. It should contain merely well-selected specimens and not be a reservoir for dumping a miscellaneous lot of stuff.

6. Unless the general library of the medical school is readily accessible from the quarters occupied by the anatomic department, a special room should be set aside for a departmental library.

B. FURNITURE, APPARATUS AND SUPPLIES

There should be an ample supply of tables, chairs, desks, book cases, museum cases and cabinets, blackboards, fixtures for artificial light and similar furniture to accommodate the students and the members of the staff.

The apparatus required is in part general and in part special. It should be sufficient not only for class-room work, but also for making good anatomic preparations, for advanced work and research.

Under general apparatus may be included: A projection lantern with lantern slides; gravity apparatus or water blasts utilized for injecting specimens, gross and microscopic; gas stoves and Bunsen burners; an apparatus for distilling water; balances; various tools and instruments, including knives, scalpals, probes, saws, chisels, vices, cork grinders and borers, bandage rollers, bone drills and injecting syringes; tripods and stands; various kinds of glassware, including museum jars, bottles, test-tubes, beakers, stender dishes, cylinders, pipettes and slides and cover glasses; chemicals, including embalming and injecting fluids, stains, hardening, fixing and preserving reagents; and various other supplies, such as wax, paraffin, celloidin, filter paper and corks.

A refrigerator is a valuable adjunct to an anatomic laboratory not provided with a convenient cold-storage apparatus.

For gross human anatomy there should be enough disarticulated skeletons to furnish a sufficient supply of bones for study. There should be an ample supply of well-embalmed bodies, so that each student may be furnished material for dissecting one side of the body. Six students are as many as should be on a single body at one time. There should be a sufficient supply of cross sections to offer every student an opportunity to use them for the study of regional anatomy.

The dissecting rooms should be provided with dissecting tables of convenient height and width and with reading stands for holding text-books. The students should be fur-

nished with chairs or stools so that they do not have to stand all the time they dissect. They should be given wrapping cloth and preserving fluids with which to keep the parts dissected in good condition. The study room should be supplied with metallic boxes or other receptacles for moist and wet specimens, including cross sections, special preparations and dissected parts. Each student should provide himself with scalpals, hone, scissors, forceps, probe, text-books and drawing materials.

In the preparation room there should be an injecting apparatus of such a nature that the fluid may be forced into the body under an even pressure. This is afforded either by a water blast or by a gravity tank. The room should contain one or more embalming tables and a tackle and clasp for handling cadavers. The room for preserving cadavers may be provided with a cold-storage apparatus, but this is not necessary unless a large number of bodies are handled. If the bodies are well embalmed they may be preserved in vats or metal-lined boxes or in water-proof sacks.

The apparatus for maceration of parts may be simple, but should be well ventilated. A furnace in which forced draft can be obtained, either by gas or other means, is necessary for the proper cremation of parts.

For microscopic anatomy and embryology there should be a good supply of prepared and mounted sections which can be loaned students or demonstrated to them. In addition, there should be a supply of material which may be given the students. There should be a laboratory assistant to prepare sections for the classes, including all steps in technic, except the mounting of specimens on the slides. The members of the class are thus provided with specimens of uniform excellence. It is probably a mistake to try to give to students to keep specimens requiring difficulty in preparation. Specimens of this nature should be merely loaned for study.

The special apparatus required for microscopic anatomy includes: Slide cabinets and trays; microscopes, both compound and dissecting, and various microscopic fixtures, including special lenses, camera-lucidas, drawing apparatus and warming stage; embedding apparatus, including a paraffin oven or a thermostat; microtomes, for celloidin, paraffin and frozen sections; and various other instruments, including a centrifuge.

Each student should be provided with a simple dissecting microscope, a good compound microscope, a dissecting tray, and a set of reagents, including stains. He should provide himself with slides and cover-glasses, a fine pair of forceps, a fine scalpal, scissors, dissecting needles, camel's hair brushes, a section lifter and drawing materials.

For embryology, in addition to the apparatus required in histology, special sets of serial sections of embryos in various stages of development and a collection of mammalian and human embryos and fetuses, in part dissected, are essential. Frogs' eggs and pig embryos preserved in formalin make excellent material for the study of the grosser features of early

development. For the study of the development of the hen's egg, an incubator of some sort is required. For neurology a special section cutter for the brain is of great value.

C. MODELS AND CHARTS

For gross human anatomy, models of paper maché, of plaster and of wax are of considerable value. Such models are essential for the study of structures difficult to appreciate in gross dissection because of their minuteness, such as the finer structure of the larynx, brain, eye, ear, tongue, central nervous system and the nerves of the head. Models illustrating the comparative anatomy of various structures are also of value.

In histology, models are useful in illustrating the minute structure of intricate regions, such as the organ of Corti and various parts of the central nervous system. They are also of great value in giving an idea of the third dimension of various other microscopic structures, but unfortunately, accurate models of this kind are not yet readily obtained.

In embryology the scarcity of material makes it impossible for the student to get first-hand knowledge of the structure of young human embryos. The Ziegler models, therefore, form an indispensable adjunct to a course in human embryology. Models illustrating the development of the frog, chick and other lower vertebrates and of various organs are likewise of great value.

Charts and lantern slides are an important adjunct to lectures in gross and microscopic anatomy and in embryology.

D. SPECIAL PREPARATIONS

To illustrate gross human anatomy there should be numerous special preparations. These should include skeletal preparations, frozen sections of the body, cut in various planes, and special dissections of various parts of the body.

The skeletal preparations should include well-articulated male and female skeletons, adult, youthful, infantile and fetal; special preparations of the skull and bones of the head; and fixed and pliable preparations of the joints. Pathologic specimens illustrating fractures and abnormalities in the bones and joints are of considerable value.

The cross sections should pass through the body in various planes, frontal, saggital and transverse, and should illustrate infantile and youthful as well as adult conditions. They may be made either by sawing frozen bodies or by sectioning formalin hardened material according to Jackson's method.

The special dissections should include regional preparations of the head, neck and extremities and dissections of the eye, ear, nose, mouth, larynx, pharynx, cranial nerves, biliary system, the genitourinary system and the central nervous system. There should be a series of preparations illustrating the viscera in infancy and youth. Specimens illustrating the distribution of lymphatics are of importance, owing to the difficulty of dissecting these in the average cadaver.

For organology and histology corrosion preparations of the lungs, liver, spleen, kidneys and other organs are of great value. For embryology, specimens cleared in costic potash and glycerin are useful in illustrating the development of the

skeletal system and in case of specimens which have been previously injected, in illustrating the development of the vascular system and other organs.

E. LIBRARY

The anatomic department should be provided with a library, which should include the standard monographs and journals devoted to the subject. As already mentioned, if the main library of the medical college is not readily accessible to the quarters occupied by the department of anatomy, the latter should have a special library in which files of current journals, text-books and works of reference are kept. Such a library should be readily accessible to students and members of the staff. In general, valuable sets of periodicals are best kept in the main library, where as a rule they will receive better care.

G. The Proportion of Didactic to Laboratory Teaching

The committee is unwilling to set a fixed standard. Laboratory work should consume the major portion of the time devoted to each of the anatomic sciences. Lectures may perhaps justly take a greater portion of the time in courses in embryology, histology, neurology and applied anatomy, than in gross anatomy.

H. The Proportionate Number of Hours to be Devoted to the Anatomical Sciences in a 3,600 to 4,000 Hour Curriculum

In most American medical schools of the better grade from 800 to 900 hours, about a fifth of the curriculum, are devoted to the anatomic sciences. In the present schedule of the Association of American Medical Colleges 630 hours out of 4,000 are allotted to anatomy, but the committee on medical education of that association has recommended that this be increased to 750 hours. Your committee believes that 700 hours in a 3,600 hour curriculum, or 750 to 800 hours in a 4,000 hour curriculum, would represent a fair proportion of time for anatomy. The majority of the committee believe in a medical curriculum in which the required work is kept at a minimum which will give students considerable time for elective work and independent study. They would prefer to see the defined required work for the whole curriculum kept within the original estimate of 3,600 hours.

The time allotted to anatomy will be sub-divided according to the arrangement of courses. Thus when a separate course in neurology is offered in which both the gross and microscopic anatomy of the central nervous system and organs of special sense are studied an equivalent amount of time may be taken from the courses in gross and microscopic anatomy. In the present schedule of the Association of American Medical Colleges 90 hours are given to histology, 90 to embryology, 30 to osteology, and 420 to gross anatomy. In the schedule recently proposed 540 hours are given to gross anatomy, 135 to microscopic anatomy and 75 to embryology. The following sub-division of time agrees approximately with the majority

of the schedules proffered by the various members of the sub-committee on anatomy for a 3,600 hour curriculum:

Gross anatomy	370 hours.
Histology	140 hours.
Neurology	90 hours.
Embryology	90 hours.
Topographic anatomy	70 hours.
Total	760 hours.

In a 700 hour schedule the course in topographic anatomy should be taken from this list and ten hours added to gross anatomy.

K. Cost of Maintaining an Anatomic Department

A few years ago the chairman of the sub-committee on anatomy obtained from those in charge of the departments of anatomy in several of our leading universities an estimate of the cost per year of maintaining their departments. Below a summary is given of the average cost of maintenance of the anatomic departments of five endowed and of four state universities. When gross and microscopic anatomy are taught in separate departments the budgets of the two departments are added together in making up the estimates. The average number of students in each class at the five endowed universities was 85; at the four state universities, 80.

Table showing the average yearly expenditures for the anatomic departments:

AT FIVE ENDOWED UNIVERSITIES

Salaries	$14,000
Technical service	2,000
Apparatus, etc.	3,600
Total	$19,600

AT FOUR STATE UNIVERSITIES

Salaries	$8,000
Technical service	1,000
Apparatus, etc.	2,600
Total	$11,600

Respectfullly submitted,

CHARLES R. BARDEEN, Chairman.

SECTION II.—REPORT OF THE SUB-COMMITTEE ON ORGANIC AND PHYSIOLOGICAL CHEMISTRY AND PHYSIOLOGY.

Taking up the questions submitted by the Council on Medical Education we offer the following recommendations:

A. Prerequisite Courses.

1. *Biology.*—A year's work in Biology occupying six to eight hours a week, should precede Physiology. This course should be largely Zoology, but should contain some Botany, particularly a discussion of the distinctions between plants and animals and the relations of life of all kinds to chloro-

phyl and thus to light. A mere study of types of structure is not the best foundation for Physiology. It is desirable that the Biology course develop general conceptions of function and life history as well as structure. A considerable part of the Biology course should be given to the anatomy of a mammal, preferably a dog or cat.

2. *Physics.*—Physics is an absolutely essential prerequisite to the best results in Physiology. The course in Physics should cover a year and occupy at least seven hours a week, about half being laboratory work. It should be supplemental to High School Physics, the latter being inadequate in most instances. On the other hand it will be expedient that this preliminary Physics course be so arranged that a student who has no credit in High School Physics can follow it without difficulty. By adjusting the laboratory work to these two classes of students it should be possible to avoid injustice to either and lack of interest on the part of either. In as much as only one year of college work is contemplated as preliminary to the four years of medicine in our curriculum it will be impossible to require Trigonometry as a prerequisite to the medical Physics course. This is unfortunate, but we are informed by Physics teachers that it is possible for them to teach the small amount of Trigonometry needed without great loss of time. If the Physics is given especially for medical students such subjects as hydrostatics, heat, electricity, sound and light may well be emphasized as of special value to Physiology. The laboratory work should be chiefly quantitative in character and the metric system should be used throughout.

3. *General Chemistry.*—The preliminary year of Chemistry should be what is ordinarily called General Chemistry, including largely inorganic chemistry, with some work in qualitative and quantitative methods. There seems to be a well-founded belief among physiological chemists and physicians that medical students often spend too much time on qualitative analysis and that more attention should be paid to volumetric analysis, which is used so frequently in the clinical laboratory. The organic chemistry where only one preliminary year is required, must come in the regular four years of the medical curriculum.

4. *Modern Language.*—Regarding the year of Modern Language this Sub-Committee is not enthusiastic. The great value to the medical student of a reading knowledge of French and German is freely acknowledged, but one year's study unless preceded by several years of similar work in High School would amount to little. Medical teachers would be unable to assume on the part of their students any power to handle foreign language. Experience with medical students (at least in the middle west), convinces us that as a rule they are woefully deficient in English. Perhaps the year of modern language is justified on the basis of the incidental improvement brought about in English. But we believe that better results would be obtained, by subjecting every student entering the preliminary year to an examination in English and then requiring all who are deficient to take work in English until reasonably proficient in grammar,

spelling and composition. It certainly is a fact the High Schools in some parts of our country graduate students whose English is doubly negative in more senses than one, and if we let their graduates go through the medical school unimproved we shall have the State Boards to reckon with, if not a discriminating public.

5. *Histology and Anatomy.*—In addition to the aforementioned preliminary studies belonging to the pre-medical year the student should have, prior to beginning Physiology, at least part of his Histology and Gross Anatomy. The physiologists would urge upon those in charge of the teaching of Anatomy the desirability, from the physiologist's standpoint at least, of the early study of the viscera. To the physiologist a preliminary knowledge of the structure and relations of these organs and of the brain and spinal cord is much more important than the anatomy of the bones and muscles.

B. Place in the Curriculum of the Subjects Assigned to this Sub-Committee.

1. *Organic Chemistry.*—The Organic Chemistry should be placed in the first part of the first year of the regular medical course. It should not go beyond the middle of this year and may properly be completed in the first third of the year.

2. *Physiological Chemistry* should follow immediately after Organic Chemistry. In schools where these two subjects are under one instructor, they can to a certain extent be developed advantageously together. In this case both should be completed in the first year of the medical course. This indeed, will probably be found best in most institutions, under the new condition of a preliminary college year.

3. *Physiology* should not be begun before physiological chemistry. It might better, indeed, follow than precede physiological chemistry. The majority of the members of the Sub-Committee, however, believe it best that the two subjects run parallel. It is best not to begin the Physiology before the second semester of the first year so as to get the advantage of Histology and Anatomy. Therefore, the most natural place for Physiology would seem to be the second semester of the first year and the first semester of the second year. (Only one member of our Committee, Prof. Hall, favors the teaching of Physiology throughout the entire freshman and sophomore years. On the contrary two members favor concentration of all the Physiology teaching into one semester.)

It will follow from our recommendations that the Committee is not in favor of going over Physiology twice, which seems a relic of the old two year repeated course. We do not believe an elementary course is necessary if the student has the proper preliminary training. The taking up of Physiology with the beginning of the Freshman year meets the almost unanimous condemnation of the Committee. (But see Professor Hall's views in appendix to this report.)

The following arrangements are suggested in order of preference. The 2nd and 3rd plans assume that the entire

Bio-Chemistry (Organic and Physiological) is under one direction and this arrangement will probably be the usual one in detached medical schools.

	1st Semester.	2d Semester.	3d Semester.	4th Semester.
1st plan	Org. Chem.	Physiol. Chem. Physiology	Physiol. Chem. Physiology	
2d plan	Biochem.*	Biochem.* Physiology	Physiology	
3d plan	Biochem.*	Biochem.*	Physiology	Physiology
4th plan	Org. Chem.	Physiol. Chem.	Physiol. Chem. Physiology	Physiology

* Meaning Organic and Physiologic Chemistry, either taught as separate courses, organic coming first, or as one mixed course.

While any of these plans is fairly logical and would doubtless be successful so far as the relations of Bio-Chemistry and Physiology are concerned, the 3rd and 4th schemes present the difficulty that Physiology is not likely to be completed in time to serve as a preparation for Pathology, Pharmacology and Physical Diagnosis. Therefore, the 1st and 2nd plans are preferable. (See, however, arguments of Professor Mann in the appendix.)

C. Minimum Hours to be Devoted to Each Subject.

On the basis of 550 hours for the group (tentatively assigned us at the prior meeting of the Council and Chairmen of sub-committees), we recommend the following approximate apportionment:

Bio-Chemistry.—Organic Chemistry .....100 hours
Physiological Chemistry.....200 hours
Bio-Physics.—Physiology .....250 hours

Our Sub-Committee wishes to put on record its opposition to any curriculum requiring more than thirty hours work a week. We believe the medical schools have gone mad in allowing their curricula to be built up on the basis of the mere addition of the hours demanded by the instructors. Educational authorities in colleges of arts and science express amazement at the pedagogical imbecility of medical educators who crush out all individuality in their students, depress their ideals to the one desire to pass off their subjects and make of them, as one teacher recently expressed it, "mere stuffed sausages."

We are willing if necessary that our time shall be cut so as to conform to a 30 hour schedule. But we wish to record our belief that modern medicine rests on Chemistry and Physics, or (as represented by our subjects), Physiological Chemistry and Physiology as much as upon Anatomy. We believe that our group should have as much time as the anatomical group. We believe other medical teachers should join with us in disabusing the minds of students of the idea that anatomy is the only important subject among the fundamentals. We believe further that the so-called practical branches should not invade the first two years to a greater extent than the course in Normal Physical Diagnosis and, possibly, Minor Surgery.

D. Optional Courses.

If the required medical curriculum can be kept at 30 hours a week or less, optional courses can be offered to advantage in all departments. These should be strictly optional in the sense that a student should not be required to take any of them to fill out his curriculum for graduation or advancement. All students, or at any rate, the better students, should be given opportunity, however, for further work, along the lines of their interests and special ability. Their individuality can by this means be preserved and developed. The nature of these optional courses will depend largely on the special training and interests of the heads of departments. In some cases undergraduate students may profitably take up research, especially some side branch of a general problem under investigation in the same laboratory. More usually the optional course will be an extension of some phase of the regular instruction, or library work, or the learning of some special technique.

The elective system involves principles quite different from the required course *with options*. We believe the elective system cannot be adopted in most medical schools for a long time. Meanwhile practical experience with the system should be accumulated in those schools which are able to put the system into operation.

E. Distribution of Time Between Laboratory and Didactic Instruction.

We do not think that a hard and fast recommendation is advisable. The chief thing is the teacher. The properly trained and capable instructor will know best how he personally can meet the conditions that confront him. The following figures are, therefore, chiefly suggestive.

Reduced to a percentage basis and applying to their original proposals, Prof. Lusk would give 47% of the total time of Physiology to laboratory work; Lee, 50%; Garrey, 50%; Lombard, 53%; Hall, 55%; Lyon, 56%; Mathews, 60%; Mann, 66%; Folin, "two to three hours of laboratory for each lecture or examination hour." The variations are not extreme and indicate a pretty strong consensus of opinion that rather more than half of the total hours assigned to Physiology should be given to laboratory work.

Similarly for Physiological Chemistry the percentages of laboratory to total time run: Lusk, 47%; Garrey, 50%; Lyon, 63%; Hall, 66%; Mathews, 71%; Mann, 73%; Lee, 75%; Lombard, 77%; Folin, as quoted above. There is, therefore, to be noted a tendency to give a larger proportion of time to laboratory instruction in Physiological Chemistry than in Physiology.

Dr. Dawson, who does not make a distribution of time that can be evaluated as above, makes the following cogent suggestion: "If we make 125 hours the minimum amount of laboratory work (in Physiology) in an institution where no electives are offered, then we might safely reduce this minimum to 75 hours in those institutions in which the remaining 50 hours must be made up by experimental work in Pharmacology, experimental Pathology, experimental Biology and the

like." There can be no doubt that the problems confronting an institution whose curriculum is largely elective are different from those where the curriculum is fixed, even if in the latter optional courses be offered as recommended in this report.

F. Methods of Teaching.

Only a few additional remarks need be made on this subject, the first one being the very trite one, "It all depends on the teacher."

Lectures, demonstrations, laboratory work, recitations and the preparation of papers in the library will all be used with success by this or that instructor. Other good teachers will use some of these methods to the exclusion of the others and secure equally satisfactory results.

Regarding didactic teaching, several Committee-men speak highly of recitations as a means of (1) keeping the students constantly up on their work, (2) of compelling them to read a text book, (3) of conveniently grading them, and (4) of correcting errors into which they may have fallen. Some would give one recitation for each two lectures. Others are not so explicit as to numerical relations but speak favorably of the recitation as a means of instruction, as compared with lectures.

As to the laboratory work, all the Sub-Committee who have spoken on the topic, are agreed that the use of mammals for demonstrations and for student work under supervision is desirable. We believe in vivisection as a necessary teaching method, as well as indispensable research method. On the other hand no physiologist should permit of any demonstration that might involve pain, except on thoroughly anaesthetized animals.

Regarding details of laboratory management it seems the best practice in Physiological Chemistry to have each student work out the experiments for himself. In Physiology this is true of some experiments, but a large number may well be done by groups of two, while four men are often worked together on mammalian experiments.

G. Training for Instructors.

This is the most important matter with which the Committee has to deal. We are agreed on three propositions which may be formulated as follows:

1. At least one man for Physiology and one man for Bio-Chemistry should devote their whole time to this work.

2. Each of these men should have been specifically trained in his subject. He should have carried on investigations in some branch of it, and be capable of independent research and of guiding others in such work. Perhaps Dr. Lombard best expresses this whole subject: "They should be specialists in their subjects."

3. Sufficient secondary trained instructors should be provided so that the time and energies of none of the departmental staff shall be exhausted by routine teaching and so that the student shall be provided with close supervision in all laboratory work.

Advanced students if carefully selected may be used to advantage as demonstrators in the laboratory but should not have exclusive charge of a course. In the laboratory of one member of this Committee there is provided one advanced student as demonstrator to each eight students of the class. Then each group of 24 or 32 students is under charge of a graduate instructor. This plan works well for Physiology. In Physiological Chemistry perhaps less student assistants would be necessary.

On some points we are not so fully agreed. Two members state that the instructors in charge should have the M. D. degree. One expresses a preference for the Ph. D., on account of the usual better training in research. Most members of the Sub-Committee, however, think the degree of secondary importance. One thinks that the subjects should be taught as pure sciences wholly without reference to the applications later to be made in medicine. But a large majority feel that the practical as well as the purely scientific aspects of our subjects should be emphasized. Prof. Hall expresses it thus: Instructors should be "men who have, through years of association in medical education and with medical practice become in hearty sympathy with and understanding of the problems of the clinician." Professor Lee says: "It is desirable that certain members of the staff should have a sufficient acquaintance with pathology and practical medicine to present to students the pathological aspects of the subjects." On the other hand we believe that the instructors in the subjects under consideration must be primarily physiologists and chemists, and that it is fallacious to expect them to be trained clinicians or to have published medicine.

The thought to be borne constantly in mind is that the Doctor of Medicine is not fitted by the fact alone of possessing that degree to conduct the courses in physiology and physiological chemistry. The fundamental training of the physiologist should be in biology, physics, and chemistry as taught in our best universities. He should then devote at least a year and preferably two or three exclusively to physiology in one of the laboratories of this country or Europe where advanced instruction and research are possible. He should do as does the surgeon, the oculist, the dermatologist—make himself *by special study* under specialists a specialist in his branch. The old but still prevalent idea that almost any young practitioner, with time on his hands, would do as professor of physiology cannot be too forcibly condemned. Similarly the training of the biochemist should be fundamentally in general biology and chemistry. On top of this should come the special training in the application of these to medicine.

It need hardly be mentioned that adequate compensation must be provided if men of the right intellect, character and training are to be induced to give their lives to this or any other field of scientific work.

H. Relation of Physiological Chemistry and Physiology.

The wish has been expressed that the limits of these two subjects be more accurately marked out, with the end in view that unnecessary duplication of work be prevented. Physiol-

ogy in the broad sense has been defined as the "chemistry and physics of Living Matter." If defined as the "Science of Function," it comes back to the same thing, for functions depend on chemical and physical processes and—so far at least as they are amenable to scientific investigation—only such processes. Physiology, therefore, involves two branches of knowledge, physics and chemistry, which are ordinarily kept fairly distinct but which have, nevertheless, in the inorganic world certain common ground, physical chemistry.

The attempts to separate the study of the physical aspects of life from the chemical aspects have not been fortunate. On the one hand the term "physiology proper" has been invented to cover the physical and nervous aspects of life phenomena, the nervous phenomena doubtless being left to the "physiologist proper" because the chemist is not yet able to attack the problem from his side of the fortress. On the other hand we find sometimes the condition where all consideration of the chemical phenomena of life is assigned to the general chemist and sometimes that in which the physiologist claims all except perhaps the analysis of the excreta. We note on the one hand that some physiologists feel that it is a mistake ever to place the chair of physiology in the hands of a chemist. We hear on the other hand the bio-chemists complain that there is a tendency to make their subject secondary and that few professorial positions are open to them.

The true relation is doubtless to be found in the definition quoted: "Physiology is the physics and chemistry of living matter." As stated already, chemistry and physics cannot be entirely separated in the inorganic world. Still less can they be separated in studying living things. Certain life phenomena are at present best studied in a laboratory having primarily a physical equipment. But every such process rests primarily on chemical changes. Some processes and particularly the results of processes are chiefly studied by the method of the chemist. But to ignore the physical properties of the blood, for example, would be quite as wrong as to ignore the chemical aspects of contractility.

In view of these facts the following propositions are offered:

1. Physiological or Bio-Chemistry should be considered a part of Physiology rather than of Chemistry. It should be coordinate with and equal to so called "Physiology proper" or Bio-Physics.

2. For administrative purposes and to secure coordination in teaching, it is probably expedient and even desirable in many institutions that the two branches of Physiology be included under one department of instruction. Either the bio-physicist (physiologist) or bio-chemist may properly be head of such department, but in either case an instructor specially trained in the other branch of Physiology should be the second ranking member of the staff.

3. In institutions where separate departments of Physiology and Physiological Chemistry are found desirable, it is imperative that the two departments keep in close touch with each other. Only by mutual understanding and concession can the teaching of physiology in the broad sense acquire unity and efficiency. And only then can a large amount of

duplication be avoided, especially in the consideration of the blood, digestion, secretion and excretion. One may admit that a limited amount of such repetition for purposes of review is not to be deplored. In too many cases, however, a serious loss of the students' time is involved.

I. Equipment.

For proper work in the group of studies assigned to this Sub-Committee the following named quarters, properly equipped, should be available—(1) Laboratory for Bio-Chemistry, (2) Laboratory for Physiology proper, (3) Animal house, (4) Library, (5) Lecture room, (6) Private rooms for the staff, (7) Storage rooms. Other rooms are very desirable, such as work shop, dark room, balance room, combustion room, operating rooms for aseptic surgery, etc.

As to the equipment to be placed in these rooms much should be left to the professor in charge. If he has been properly trained and is thoroughly acquainted with the subject matter to be taught and the methods of conducting laboratory instruction therein, the school is certain to get a more useful equipment by following his advice than by purchasing according to any list that could be drawn up. We have seen elaborate lists of apparatus formulated by state boards. We have at least heard of schools where that apparatus set attractively forth in glass cases served as a constant advertisement of the fact that the schools were "in good standing." And we know of a teacher of Physiology who asked for help in setting up a nerve-muscle apparatus and then brought around some frogs preserved in formalin with which to make the experiments.

It's the "man behind the apparatus" who is important. On the other hand there are certain apparatuses almost universally used.

The following lists, therefore, are drawn up not as absolutely hard and fast, but rather as suggestive. Some latitude should be allowed in evaluating the equipment of any laboratory but wide deviation from these lists is indicative of insufficient equipment.

1. Laboratory of Bio-Chemistry.—In addition to the usual student equipment of chemical desks provided with reagent bottles, abundant glass and porcelain ware, iron-ware, Bunsen burners, rubber tubing and stoppers, stock of chemicals, etc., the laboratory should be equipped with fume chambers, still for water, Kjeldahl apparatus, spetroscope, polariscope, balances, gas generating apparatus, drying ovens, blast lamp, incubator, refrigerator, apparatus for analyzing milk, colorimeter, centrifuge, Soxhlet extraction apparatus, Liebig condensers, aspirator pumps, porcelain filters, hydrometers, volumetric flasks, burettes, thermometers, etc.

2. Laboratory of Physiology Proper.—*General:* Convenient tables, glass ware of various kinds, ample stock of reagents and reagent bottles, rubber tubing and stoppers, iron stands and tripods, burners, water-bath, etc. Compound microscopes with high and low power objectives, slides and cover glasses. Refrigerator, incubator, centrifuge, vacuum pump, hydrometers, thermometers, analytical balance, coarse

balance. Stock of tools and material for mending and making apparatus.

For Experiments Involving the Graphic Method.—Kymographs, myographs, heart levers, batteries, keys, wires, inductoriums, metal and non-polarizable electrodes, pole changers, moist chambers (unless the same end is met in other ways), temperature chambers, circulation schemes, rhecords, capilarry electrometer or galvanometer, magnetic signals, tuning forks or other similar apparatus, clock or pendulum.

Most of this apparatus should be provided in the ratio of one piece of each kind for each two students of a section.

For Mammalian Experiments.—Animal boards and holders, basins, sterilizer, instruments such as bone forceps, trephine, saw, etc., which students cannot be expected to furnish. Manometers and other apparatus for blood pressure. Tambours, tracheal and arterial cannulae. Apparatus for artificial respiration.

For Experiments on Man.—Sphygmographs, sphygmomanometers, cardiographs, pneumographs, spirometer, stethoscopes, hemoglobinometers, hemocytometers, spectroscopes.

For Study of The Senses.—Artificial eye, eye model, perimeter, charts, ophthalometer, ophthalmoscopes, lenses and prisms, color mixer, tuning forks, Galton whistle, resonators, ear model,esthesiometer, apparatus for reaction time, etc.

3. Animal House.—Proper space for the hygienic care of dogs, rabbits, guinea pigs, frogs, turtles. Separate cages for metabolism experiments and for operated animals.

4. Library.—Susceptible of indefinite extension. If the head of the department is a research man, he must have the principal current journals at his disposal. Complete files can be accumulated with difficulty, but funds should be available for this purpose. A good collection of text and reference books, and at least the principal physiological journals in English, should be open to the students. The physiological books may be kept in the department or in the general school library.

5. Lecture Room.—The lecture room may be used in common with other departments. Charts or lantern slides, models and demonstration apparatus are useful and necessary.

The other rooms mentioned need no special discussion.

J. Running Expenses and Service.

The laboratories of bio-chemistry and physiology must not only be adequately equipped, but also provided with a yearly allowance for the support of both teaching and research. The expense for animals, glassware, chemicals, etc., is considerable. Each laboratory should also have a *Diener*, a trained janitor. A technician is almost indispensable in physiology.

K. The Allowance of Credit.

We wish here to devote a few words to the treatment of students passing from one college to another. In Germany, as all know, migration is easy and common. In this country it is difficult. The student is usually loaded down with conditions and finds himself working at cross purposes, often repeating what he has already done. We believe that instruc-

tors should recognize the *principle of equivalent discipline* rather than insist on an exact equality of courses. A hard and fast curriculum to be followed by every physiologist of the country would mean an intolerable surrender of individuality and consequently poor teaching. On the other hand a liberal attitude in regard to the work of other instructors and in the allowance of credit would facilitate student migration and tend to make of the schools an harmonious whole instead of a number of jealous and uncoordinated units.

Respectfully submitted,

E. P. Lyon, Chairman.

SECTION III.—REPORT OF SUB-COMMITTEE ON BACTERIOLOGY AND PATHOLOGY

Your committee has had difficulty in the preparation of a report. In the course of the work communication was had with the different members of the committee, questions submitted and answers received. In many cases no replies were received, or the information given was too meager to be used. Information as to actual conditions was also obtained from catalogues. In several cases there was a decided expression of opinion and from some of the representatives in the strongest schools in the country adverse to the preparation of a fixed curriculum. It was felt that a broad latitude should be given not only in regard to the relative time given to pathology or bacteriology, but also as to its situation in the curriculum and the method of teaching. Among the best schools in the country there is considerable variation in all of these. There is so close an interrelation between the different subjects in the medical course that a deficiency in one can easily be corrected by extension in another. Much of the importance of anatomy, physiology and pathology lies in the scientific discipline given to the student in these subjects. With the introduction of laboratory methods into clinical medicine and surgery the same discipline can be given in these subjects. It is rare that a medical school is able to arrange its work in an absolutely ideal manner. Much will necessarily depend on the facilities which will be present in the different places with regard to hospitals, etc., and each school should be left to work out as far as possible its own salvation. Moreover, in schools in which the elective system prevails during one year, or for the entire course, necessarily there will be less required work in the different subjects than in those schools in which the curriculum is rigid. With this understanding the general opinion as derived from correspondence is that to pathology and bacteriology in a rigid curriculum of 3,600 or 4,000 hours 500 hours should be alotted. Opinion as to the proportion of hours between the two subjects varies. A fair division would seem to require that bacteriology should be given one-third to one-half the time of pathology. In general, it has been found that in most schools the instruction in bacteriology and pathology is given in the second year, and this is probably advisable. The instruction in bacteriology should precede or accompany pathology. The efficiency of the course both in

pathology and bacteriology will depend on the preliminary medical training of the student and on the training in the first year. For these subjects it is essential that the student should have already had experience with working with the microscope and a comprehensive knowledge of normal structure, both gross and microscopic. A course in embryology will also be found advantageous. In both bacteriology and in pathology stress should be laid on the exercises in technical methods. The methods used in both of these studies will also be used in the clinical work. There should be provided for each student microscopes and apparatus, which will be used in the work, and each student should have space sufficient for work and for the care of apparatus.

To make more specific recommendations using and answering the question suggested by the Council.

(a) The place of the subjects in the curriculum. The main instruction should be given in the second year with as much extension as possible into the third and fourth. The principles of the subject should be taught in the second year and the interrelation between lesions and clinical course of disease demonstrated in the clinical autopsies in the third and fourth year. The instruction in the third and fourth year may be made optional.

(b) Prerequisite courses. Anatomy, including histology and embryology, physiology and chemistry. It is better that the student should have had a course preliminary to his medical studies in general biology embodying the study of the form and function of simpler organisms.

(c) The necessary qualifications of instructors. The heads of departments should give their entire time to the work. There should be certain instructors also who give entire time. It is, however, advantageous to have in each of these departments instructors whose positon is temporary and whose chief interest is in the clinic. Just as it is highly advantageous for the clinicians to have had the training which comes from one or more years devoted to study and teaching in anatomy, physiology or pathology, it is equally advantageous that all who are engaged in teaching bacteriology and pathology should have had clinical training in order that they may ever be alive to the importance of the clinical questions which the practitioner will encounter.

(d) The best methods of teaching. This will necessarily vary according to the special qualifications of the instructors. One instructor may use the didactic method largely and in his hands this method will be found to give admirable results, while in the hands of another the results coming from the method would be valueless. In all cases, however, the main stress should be laid on the laboratory teaching. In this it is disadvantageous to make any artificial separation of the subjects. The didactic, the microscopic and the naked eye study should go hand in hand together. It is important to keep ever before the student the part which the work he is doing plays in leading to a more complete comprehension of disease.

(e) For the laboratory equipment every student should have the independent means of work. He should certainly

have a microscope with high power lenses. This may either be provided by the student or the school may possess the microscopes and a small charge for their use made. This charge should be no more than would be sufficient to cover the repairs and the replacement of the microscope in twelve or fifteen years. The additional apparatus will depend on the character of the work demanded. As a part of the apparatus, should be included a well-stocked museum which should be freely used.

Respectfully submitted,

W. T. COUNCILMAN, Chairman.

SECTION IV.—REPORT OF THE SUB-COMMITTEE ON PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Chapter I—Introduction

The committee has undertaken its assigned task with a sincere conviction of the possible benefits to be derived from a successful result. A model curriculum for the modern teaching of medicine is highly desirable for a variety of reasons:

1. It adds to the efficiency of teaching, and spares wasteful experiments.

The enormous development of the science of medicine in certain directions has necessitated radical changes in the medical teaching. These changes have been determined, to a considerable extent, by temporary expediency. A medical course based on temporary expediency, however, can not be ideal; it must be more or less unbalanced.

A radical reform has become desirable. This can not be accomplished by patching up the existing structure here and there. The reorganization must be complete, from the ground upward. Any attempt to fit the general plan to the existing conditions must prove futile; on the contrary, the existing courses and methods must be fitted to a general plan. In this sense, however, the accumulated experience of our existing and past courses is indispensable, for no perfect plans can be evolved from theory alone. The present courses at the different schools all contain such experience, whether accidental or experimental. At present, however, the experience of each institution remains local, and is scarcely available to others. This results in much waste of effort and sacrifices the time of the students and instructors. A central committee, which would take upon itself the task of making their experience available, would therefore perform the labor which otherwise every institution would need to repeat for itself. As a result of its study, this committee could suggest a fairly definite model curriculum. A school which wished to reorganize its teaching could thus learn at once the directions which

promise the best success. It would thereby be saved the time, labor and waste of much independent experimentation, and its courses could be given much greater immediate efficiency.

2. It prompts uniformity in medical education.

The committee is not in sympathy with the idea that the teaching in all the medical schools should be identical. In the first place, this would be impossible; for however much the matter and equipment may be unified, the personality of the instructor always remains as an individual factor. The methods which are highly efficient in the hands of one instructor may fail entirely with a second; who, however, may achieve the same end by methods which would fail in the hands of the first. The personality of the student-body in different institutions is a similarly variable factor. Local conditions, permanent and temporary, also demand variations in methods.

On the other hand, however, there is a certain irreducible minimum of knowledge in each department, which is indispensable for the successful practice of medicine. This minimum, at least, should be attained by all institutions; and a model curriculum can serve a most useful purpose by pointing out, with all impartiality, what this minimum should be. As to methods, those which are practical can, after all, be reduced to a relatively small number, and their relative efficiency and availability under varying conditions can be fairly well laid down.

The main emphasis, therefore, should be laid on uniformity in the minimum required results, rather than in methods. For this purpose, however, a certain definite, but very elastic unification of methods is indispensable. The model curriculum should aim to point out by what methods the required result may be most efficiently obtained. It will be necessary to frame these methods so as to leave full play to the various local conditions, and so as to encourage rather than to discourage, the individuality of the teacher. This degree of unification of results and methods will redound, in the first place, to the advantage of the student. It will enable him to determine, personally or through the proper agencies, the relative grade of the instruction given at each school, and if, for any reason, he moves from one school to the other, it will enable him to receive the full benefit of the courses which he has taken.

3. It is a guide to the best training for practitioners in medicine.

The committee is convinced that the ordinary medical school should fit the student for the general practice of medicine; and that it should not attempt anything further in the undergraduate years. It is also convinced that it is unnecessary for this training that the student should have a complete knowledge of each subject, even were this possible. It shall,

therefore, recommend in its model curriculum, in the first place, that amount of training which it considers indispensable, and which should be fairly uniform in all institutions. It shall then aim to show the various directions in which this training may be amplified, if this may be thought desirable. In this amplification, a much greater diversity can be safely encouraged.

These, then are the general principles which have guided the committee in the compilation of its report.

The limitation of the total curriculum to 3,600 hours is a serious departure from the present custom of most schools. There can be no doubt, however, that the class-work at present is altogether too heavy, to give the students the time which is indispensable for the adequate preparation and digestion of the subjects; and some relief is urgently needed. The necessity of incorporating in the course the continuous additions to medical knowledge has hitherto been met mainly by adding more hours to the curriculum, at the same time attempting to retain all the old courses in their full scope; forgetting that there is a physical limit to what may be learned in a given time and also to the number of hours, weeks and years which can be devoted to undergraduate study. It is wise to frankly acknowledge this fact, and to limit the scheduled appointments to the amount which a human student can profitably assimilate in the time at his disposal. This does not mean that the student should do less work than at present; but that he should do more work outside of class hours. By systematizing the class work with this in view, and by curtailing courses whose value is largely traditional, it may be quite possible to cover the really essential matters in a much shorter time than is now used, although 3,600 hours will be considered by many as the minimum, rather than as the ideal.

Chapter II—Methods of the Committee

In accordance with the request of the Council on Medical Education, the chairman appointed ten voting members. In order to secure an even more representative expression of opinion, however, additional "correspondence members" were appointed—with the consent of the regular members—and requested to co-operate in the discussions. The various subjects coming within the province of the committee were grouped under nine headings. General questions were suggested by the chairman, and discussed by the member to whom the subject was assigned. Further specific questions were then submitted by the chairman, and thrown open to a general discussion. The answers may be assumed to represent the collective opinion of the members and form the most

valuable part of this report. They are therefore reproduced in the appendix. From this discussion were derived the final recommendations.

Chapter III—Syllabus of Courses

The following syllabus has been arranged so as to allow considerable latitude. This seems desirable, firstly, because it permits different schools to emphasize their special facilities along certain lines; and, secondly, because it makes the syllabus available also for schools, which give more than 3,600 hours to the total curriculum. In this case the proportion of the total time which is allotted to this department should be about the same; namely, about 6⅔ per cent. (1/15). The "means" given in the synopsis indicate the time which is considered the best for the 3,600-hour curriculum; but they are, if anything, less than what would be desirable in an ideal curriculum.

1. Synopsis of Courses and Hours

The following courses have been adopted by the committee:

COURSE A.—Pharmacy, Chemical Toxicology and Elementary Prescription Writing: Latter part of first, or *early part of second year:** 15 to 20 hours didactic, 15 to 25 hours laboratory; mean, 35 hours.

COURSE B.—Elementary Materia Medica: *Optional:* 30 to 45 hours.

COURSE C.—Experimental Pharmacodynamics: *Latter part of second* or early part of third year: 10 to 25 hours didactic, 24 to 45 hours laboratory; mean, 50 hours.

COURSE D.—Systematic Phamacology, Toxicology, Materia Medica and Therapeutics: Latter part of second and *early part of third year*: 40 to 100 hours didactic; mean, 70 hours.

COURSE E.—Non-Pharmacal Therapeutics: Sections in *third year:* 10 to 30 hours' demonstrations; mean, 10 hours.

COURSE F.—General Therapeutics: *Latter part of third* and early part of fourth year: 30 to 72 hours didactic; mean, 45 hours.

COURSE G.—Therapeutic Clinics: Latter part of third, or in the *fourth year*: 20 to 36 hours; mean, 30 hours.

COURSE H.—Prescription Writing: 20 to 30 hours, included in Courses A, F and G.

Grand total, 184 to 321 hours; mean, 240 hours = 5.9 per cent. of 4,100 hours.

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* The italics indicate the time in the course which is considered the most advantageous by the committee.

2. Detailed Discussion of Courses

COURSE A—PHARMACY, CHEMICAL TOXICOLOGY AND ELEMENTARY PRESCRIPTION WRITING.

(a) Botany—Systematic botany should be an elective entrance requirement. An hour or two of the medical course may be devoted to the explanation of such botanical terms as are commonly used in materia medica (root, rhizome, fruit, seed, etc., and to a demonstration of the leading features of the histological structure of plants.

(b) Plant Chemistry—A few hours (2 to 4) of laboratory work could be devoted to illustrating the general chemical characters of the pharmacologically important classes of plant constituents (alkaloids, glucosides, etc.). This course may be made continuous with the course in incompatibilities and toxicology.

(c) Metrology—Sufficient drill should be given in both the metric and common systems to render their use thoroughly familiar to the students.

(d) Didactic Pharmacy—This should be limited to the explanation of the common pharmaceutical processes (trituration, maceration, percolation, etc.) and of the important distinctive features and definitions of the classes of pharmaceutical preparations (liquors, tinctures, emulsions, pills, etc.).

(e) Pharmaceutical Laboratory — The manufacture of pharmaceutical preparations, such as tinctures, extracts, etc., is of no direct value to the modern physician. It has, however, considerable indirect educational value by fostering a better understanding and appreciation of the official preparations. An optional course of 10 to 20 hours deserves encouragement, but the required work need not exceed 3 to 5 hours and cover only a single preparation, each, requiring solution, infusion, maceration, percolation and emulsion. These processes may even be demonstrated, but individual work, or work in pairs, is preferable.

(e) Prescription Compounding—Students who intend to practice in isolated localities may require a fairly thorough course in compounding; arrangements may therefore be made in some way for an optional course of 10 to 30 hours. A rather shorter course (10 to 15 hours), covering a selection of typical compatible and incompatible prescriptions, is also highly beneficial to the ordinary student by familiarizing him with the commonly used preparations, as they reach the patient and by giving him greater confidence in prescribing. This work may be made either optional or required; but all the students should at least be taught to make pills, capsules, simple mixtures, and ointments (2 to 3 hours of individual work required).

Assignment to the prescription department of a drug store or dispensary is not advised, since it seems neither an effective nor an economical means to the desired end. It may, however, be offered as an optional course.

(f) Incompatibilities.—Due emphasis should be laid on the fact that the physician who writes simple prescriptions runs small risk of incompatibilities; but a safe knowledge of the subject is none the less necessary. The principles may be covered in two to three hours of didactic and two to four hours of laboratory work; but the subject needs constant review for which purpose it is suggested that individual incompatible prescriptions be explained to the class at frequent intervals.

(g) Chemical Toxicology.—Since the actual isolation of poisons does not come within the province of the practicing physician, the committee believes it superfluous that any extensive amount of time or labor should be devoted to the subject of toxicologic analysis. Even an optional course should by preference be postgraduate. The required course should cover only the duties of the physician, the general principles of diagnosis and treatment and the principles of the separation into analytical classes (volatile, neutral principles, alkaloids, metals). This part of the course may be given by demonstration. The detailed study of the reactions of individual alkaloids, etc., is not indispensable. Instead, there could be substituted 2 to 5 hours of laboratory work, with easily performed reactions for demonstrating the presence of drugs in the urine, the inter-actions of important chemical antidotes, the reactions of corrosives with blood and tissues, and the effects of gases, etc., on blood; making a total of 6 to 8 hours. This instruction may be given either in the laboratory of chemistry or of pharmacology, according to convenience. The instruction in the actions of poisons can be given most economically with courses C and D in pharmacology.

(h) Elementary Prescription Writing.—The principles of prescription writing may be introduced at this time, together with some drill in their application (6 to 10 hours). The Materia Medica of flavors and colors may also be studied. Concerning the use of Latin in prescription writing, the committee considers this desirable for the names of the ingredients (inscription); indifferent as to the directions to the dispenses (subscription); and objectionable in the directions to the patient (signature). The student should, however, know the meaning of the Latin phrases which are commonly used. This amount of Latin may be readily taught in the course, so that Latin need not be a compulsory entrance requirement, so far as this subject is concerned. (See also Course II).

Course A would therefore be somewhat as follows:

DIDACTIC.	HOURS.	LABORATORY AND DEMONSTRATIONS	HOURS.
Metrology	2 to 3	Plant structure	1 to 2
Pharmacy	3 to 5	Plant chemistry	2 to 4
Incompatibilities	2 to 3	Pharmaceutic manufacturing	3 to 5
Prescription writing	6 to 10	Incompatibilities	2 to 4
		Prescription compounding	2 to 3
		Chemical toxicology	6 to 8
Total	13 to 21	Total	16 to 26

This course might be given in the latter part of the first year, but more advantageously in the *early part of the second year*; four hours per week for ten weeks, 40 hours.

COURSE B.—ELEMENTARY MATERIA MEDICA

There is considerable diversity of opinion as to how and when the systematic instruction in the natural history, physical characters, preparations, doses, etc., of drugs should be given. The minority advocate that this be a separate course, interpolated between pharmacy and pharmacodynamics. The decided majority, however, believe that the subject can be treated more profitably and more economically in connection with Course D on pharmacology, the subject being reviewed incidentally in Course F in general therapeutics. The committee, therefore, does not recommend Course B as an integral part of the Model Curriculum. If, however, such a course is offered, the committee recommends that it be given toward the end of the pharmacy course; that it be conducted after the manner described under Course D and that it should not occupy more than 30 to 45 hours.

COURSE C.—EXPERIMENTAL PHARMACODYNAMICS

For the reasons advanced in Professor Abel's report, the committee believes that the actual observation and study of a selected series of pharmacologic phenomena is indispensable to a proper and scientific understanding of therapeutics. It therefore advocates that experimental pharmacodynamics be included in the model curriculum. This experimental work may be arranged so that the emphasis is laid on illustrating either (a) the general principles of drug action, or (b) on the more detailed study of the principal drugs. The plan (a) is perhaps preferable if the experimental course is given apart from the systematic didactic course (D); whereas, the plan (b) is preferable when the experimental and didactic courses are given simultaneously.

Since both plans have been successfully followed in different schools and since one or the other may offer superior advantages according to circumstances, the committee includes both plans as alternatives in the model curriculum. Whichever plan is followed it should be emphasized that the main

value of the course consists in accurate observation, critical analysis and scientific deduction rather than in the mechanical performance of set experiments. Careful notes, full reports and well-planned conferences and discussions are therefore essential to the best results. It is highly desirable that at least the major part of the experiments should be *performed by the students* arranged into groups. By varying somewhat the experiments assigned to the different groups a much larger field may be covered with equal efficiency. A relatively large staff of demonstrators is required for this plan. One demonstrator per twelve students appears to give good results. The plan of appointing some clinical men to these temporary demonstratorships has several advantages.

Where conditions do not permit the performance of the experiments by the individual students, demonstrations may be substituted, either as a separate course or in connection with the didactic course. Demonstrations, however, are vastly inferior to individual work, even when the demonstrations can be so arranged that the students have a good view of what is going on. If they can not be so arranged they are, of course, quite useless.

The individual experiments in a course of experimental pharmacodynamics must vary from time to time and place to place so that a rigid syllabus would be neither feasible nor desirable. The following is offered merely as an illustration of what might be covered in a course of twelve exercises of two or three hours each with an equal number of conferences; requiring one or two mammals per student for the entire course and only the ordinary physiological apparatus. This time presupposes that the students have been trained in physiological technic, otherwise the time must be correspondingly increased.

ILLUSTRATIVE COURSE IN EXPERIMENTAL PHARMACODYNAMICS

Exercise 1.—Corrosives, Stains and Local Actions.
2.—Absorption and Excretion.
3.—Synergism and Antagonism.
4.—Central Convulsants and Depressants.
5.—Muscle and Nerve.
6.—Cold-blooded Heart.
7.—Peripheral Nerves.
8.—Blood-pressure and Respiration; (Anesthetics).
9.—Blood-pressure and Heart; (Nitrites, Epinephrin and Digitalis).
10.—Diuresis and Peristalsis.
11.—Perfusion of Excised Organs.
12.—Excised Mammalian Heart.

Most of the essential actions of the really important drugs could be incidentally illustrated in this course and the conferences can be so framed as to give the students an objective

knowledge of the principles and main phenomena of pharmacology. Only such experiments should be made as are painless.

The course should be given after the student is well advanced in physiology, i. e., in the *latter part of the second*, or early in the third year. The required course should occupy 40 to 60 hours including 10 to 25 hours of conferences. It can, of course, be extended indefinitely as an optional subject.

COURSE D.—SYSTEMATIC PHARMACOLOGY.

Provision must be made somewhere in the course for systematic study of the important drugs in order to bring together and focus in the student's mind what is known and essential concerning their action in health and disease; their toxicology; their administration; their origin; the available preparations, dose, etc. This might be done either in pharmacology or in therapeutics. It seems best, however, to give the systematic presentation in the first major didactic course, pharmacology, and to review the main facts in therapeutics. The committee is most emphatically of the opinion that the limited time at the disposal of the medical sudent can be much more profitably spent in the thorough study of the relatively few important drugs, which he will ordinarily use, or which are of great scientific interest, than if the same time were devoted to acquiring a mass of superficial and useless or worse than useless information about the numberless drugs described in the books, and concerning which very little of definite value is known. The only valid argument which has been advanced as an excuse for burdening the students with this useless rubbish is that it is required by some of the state examining boards. The committee hopes and believes that this condition will be corrected as soon as the attention of the examiners is properly called to the matter; for it is evident that the service of the practitioner to the community can not be gauged by his parrot-knowledge of useless drugs. Acting on this supposition the committee recommends that drugs of doubtful value, official or otherwise, be given only bare mention, or be omitted from the course. Hard and fast lines can not be drawn, but for guidance the committee presents in Appendix A its judgment of the relative importance of drugs and their preparations from the teaching standpoint. It hereby appeals to the state board to confine their questions to the drugs and preparations which are listed in columns A and B.

In the course, these drugs should be considered in suitable order, arranged into groups according to their actions or uses. This arrangement and sequence may be left entirely to the individual teacher. The drugs or groups would be considered from the following standpoints:

(a) Didactic Pharmacodynamics.—The important effects and their scientific explanation. This would be the major subject of the course. If the experimental work has been completed, this part of the course would consist mainly in a systematized review and expansion of matters with which the student is more or less familiar. Otherwise, the two courses will go hand in hand; or if the demonstration plan is adopted it could be introduced into this course.

(b) Toxicology.—The symptoms and treatment of poisoning. These subjects are so closely related to the preceding that they are doubtless studied more profitably and most efficiently in close connection.

(c) Therapeutic Uses.—The knowledge of the effects of drugs in and on diseased conditions is necessary for a thorough understanding of their actions. A broad discussion of the therapeutic uses of drugs at this time of the course is also useful by stimulating the interest of the student and by teaching him how scientific knowledge is applied to practical problems. Also, it forms the best possible preparation for Course F. in Therapeutics.

(d) Materia Medica.—This much-abused term is here applied to the origin, physical characters, preparations, doses, etc. The majority of the committee believes that the significance of these matters is better appreciated by the student, and that the subject is therefore more interesting and is more easily mastered and better retained when it is presented in connection with the present course, than when it is sudied as a separate preliminary course. In any case much of this matter is of minor importance to the modern practitioner and this should be constantly borne in mind. The danger of over-burdening the student's mind with useless knowledge can be best avoided by teaching the subject with a view to its actual application in prescribing. It is essential that the student should become familiar with the composition and physical characters; with the appearance odor and taste; with the solubility or miscibility and incompatibilities and with the methods of administraton and dosage of those preparations which are commonly prescribed in practice. It is useless, as it is impossible, to expect this knowledge in regard to all the drugs, official or otherwise, which are rarely if ever used. Nor is it necessary or desirable that the student should familiarize himself with all the possible preparations and combinations of even the important drugs. He should therefore be required to learn only a comparatively small number of these preparations. As has been said, the attention of the examining boards should be called to these facts. The origin of each important drug; whether it is a leaf or root; the botanical name of the plant; the appearance of the drug in its crude form—these are matters of no practical use although some acquaintance with them is generally expected from the

well-trained physician, no great emphasis should be laid on them.

The branch of materia medica tends to mechanical memorizing, a necessarily dry, tedious and ineffective process. It is therefore desirable to utilize every agency which will help to fix the matter in the student's memory without the expenditure of too much time. The preparation of descriptive schedules by the student, somewhat after the pattern given in Appendix B, is advised as a means to this end. The study of the actual specimens of the important preparations is indispensable and the demonstration of the important crude drugs is desirable. A required ability to identify a limited and carefully selected list of preparations and drugs is useful for this as well as for other purposes.

Course D should fall in the last part of the second, or in the *first half of the third year*. As described, it covers 50 to 75 hours of didactic work, and 10 to 15 hours for the study of specimens. The didactic work should comprise both lectures and recitations in something like equal proportion and should demand a liberal amount of text-book study. The courses in pharmacology and therapeutics are in a sense complementary to each other and if the one course is enlarged the other may be somewhat curtailed. Neither, however, can be safely reduced below the minima which we have stated.

COURSE E.—NON-PHARMACAL THERAPEUTICS

The committee is of the opinion that didactic instruction in the general principles, effects and indications of non-pharmacal therapeutic measures—including diet, practical hygiene, massage, exercise, baths, electricity, *x*-rays, phototherapy,, thermotherapy, balneology, climatology and psychotherapy—should for the present be introduced systematically and adequately in the didactic Course F on general therapeutics and incidentally in the clinical courses as occasion arises. There should, however, be a demonstration course in which small sections of students are taught the actual applications of the physical measures, as also such matters as enemata, position, cupping, venesection, saline infusion, immobilization, counter irritation, and similar details in the practical management of the patient. This should occupy 10 to 20 hours, and be placed in the *early part of the third year*. The department of therapeutics should also secure the cooperation of all the clinical departments, so that the instructors charged with the dispensary and wardwork will actively secure to the students under proper supervision the greatest possible opportunities for the practical application of therapeutical measures, pharmacal as well as non-pharmacal.

COURSE F.—DIDACTIC GENERAL THERAPEUTICS

The committee recommends unanimously and most emphatically that a thoroughly systematic and well-planned didactic

course in applied therapeutics or applied pharmacology be required. This should be directed toward teaching the principles and practice of rational treatment. It is therefore absolutely essential that the subject matter be arranged and presented according to pathological conditions and processes and *not* according to drugs. The committee again is unanimously and emphatically of the opinion that a course on therapeutics arranged according to drugs can not be accepted as a substitute, and that any great amount of time devoted to such a course is largely misspent. Such a course places the emphasis in the wrong place, and thus fosters a false and misleading attitude. The application of opium, for instance, is not the aim, but a mere incident in therapeutics. The "therapeutic uses" of drugs as a branch of instruction nevertheless has a distinct although strictly limited value. This may be appropriately and fully introduced in the didactic Course D in Pharmacology, but when taught as a separate branch it is misleading and defeats its own purposes. It is impossible by a mere study of drugs to learn their proper use.

When properly given, the course in general therapeutics will serve to correlate and apply to the practical purpose of treatment what the student has learned of physiology, pathology, pharmacology and medicine. It should be so planned as to cover the entire field of the conditions amenable to treatment, with due regard to their relative importance. It may be convenient to group these conditions as gastrointestinal, respiratory, cardio-vascular, etc., reviewing briefly their physiological and pathological relations and discussing the manner in which these may be modified by remedial agents—pharmacal, physical, psychical, etc., as the case may be. The presentation should be thoroughly practical as well as scientific. The really important therapeutic measures should be exhaustively discussed in all their important relations, as occasion for their use arises; omitting those drugs the usefulness of which is not well established. The practical features of pharmacology would thus be reviewed, such as the collateral advantages and disadvantages in the effects of a drug which indicate its use in certain circumstances and contra-indicate it in others; the signs of toxic effects and other clinical signs or symptoms produced by it or by the diseases which demand its withdrawal; the particular preparations which are most advantageous; illustrative prescriptions, etc. The important preparations and their doses could thus be emphasized by frequent repetition but the repetition of longer discussions would be avoided by referring to their previous mention. This course would also offer the occasion for the systematic presentation of non-pharmacal measures as described under Course E. The application of practical hygiene should be especially emphasized. It is desirable that this course should be illustrated by the occasional use of clinical material. This is not absolutely

necessary, however, if the therapeutical clinics (Course G) are well given. The course should make provision for lectures and recitations. It is essential that the instructor in charge of this course should be sufficiently broad and well trained, to grasp the significance of the modern conceptions of both pharmacodynamics and clinical therapeutics.

The course should be given toward the *end of the third*, or beginning of the fourth year, and occupy 30 to 60 hours.

COURSE G.—THERAPEUTIC CLINICS

The student, having learned the principles of therapeutics, should see the actual application of these principles to the patient, and he should see the actual results of the treatment. This is done to some extent, of course, in every medical clinic, but the subject is of such great practical importance that it should not be subjected to the risk of being neglected or obscured by the other interesting features of the ordinary clinic. In other words, it should be some one's especial business to emphasize the therapeutical features of the clinical cases. The most effective means for this purpose would seem to be the establishment of therapeutical clinics; i. e., clinical lectures and demonstrations in which the treatment should be especially emphasized just as we now have clinics which are mainly devoted to the subject of physical diagnosis The art of therapeutics can only be acquired by observing the actual application of its methods and the ensuing results. These should be shown in these clinics even in cases which do not possess other interesting features. Such clinics would also offer excellent opportunities for practical prescription-writing.

It is highly important that the instruction in therapeutics should not be confined to the department which is nominally charged with this duty. Every clinical instructor, in his lectures or ward and dispensary service, should do his part toward training the students in this, the most important part of their future career and every instructor should use care that his therapeutic practice sets a worthy example to the students who follow him. Incalculable harm has been done, for instance, by the common and convenient habit of writing prescriptions in hospital and dispensary practice by numbers, instead of ingredients.

Your committee feels that the teaching of the special therapeutics used in surgery and in the various specialties, lies beyond its scope, since this can only be taught in connection with these subjects. At the risk of repetition, it wishes again to urge on all departments their opportunity to drill the students not only in writing prescriptions but also in the giving of full and complete directions to patients and in the general management of the patient, care as to diet, prophylaxis, etc.; teaching the students as if the trained staff of the

hospital were not always at their disposal but as if they were treating private patients.

The therapeutic clinics as defined above, should occupy 20 to 30 hours in the end of the third, but mainly *in the fourth year.*

COURSE H.—PRESCRIPTION-WRITING

There is perhaps no branch of medical teaching which has been so frequently, and on the whole, justly criticized, especially of late, as that of prescription-writing. It has been held largely responsible for the want of progress in scientific therapeutics and for the corresponding invasion of proprietary therapeutics. The recent graduate, as a rule, is certainly far from proficient in the writing of prescriptions. He has generally been taught the simple principles, but not the proficiency in their application, which comes only by practice. Prescription-writing, in fact, covers not merely the technic of wording a prescription, but what is far more important, the choice of the substances for obtaining a given therapeutic end and the form and combination in which these may be properly administered, such as the flavoring, the avoidance of incompatibilities, etc. It therefore constitutes the actual application and test of the scientific knowledge of the student and is to therapeutics what ward clinics are to diagnosis. To acquire this proficiency requires frequent repetition. As has been pointed out, there are numerous occasions for teaching the subject incidentally in the clinical and didactic work and these should be utilized to the full. Assured results, however, can only be expected from frequent and systematic "drills." The principles having been taught in Course A (which see), these drills should continue through the course—whether as set hours, or as part of the lecture hour, must depend on circumstances. During Course D these drills would emphasize the *form* in which the drugs can be prescribed. During Course F the stress would be laid on prescribing for given hypothetical conditions. During Course G the prescribing would be for actual or hypothetical cases. This might be continued as an optional course throughout the fourth year. Allowing five to six hours in connection with each of these three courses and adding the 6 to 10 hours in Course A would make 21 to 28 hours of systematic instruction in this subject.

As to the methods of conducting these drills, they must vary with local conditions. Black-board exercises should always form an important feature, for they are the best means of calling attention to the pitfalls and difficulties and showing how to meet them. Some provision for criticizing the work of the students in the seats, and for prescriptions to be written at home is also desirable.

Chapter IV—Schedule

There will always be so many variables in the medical course that it would be quite useless for the committee to recommend a detailed schedule. The data for this can easily be gathered from the preceding chapter. For the sake of illustration, however, and to show how these courses would work out in practice, two schedules are herewith attached, one of 240 hours, for a course of thirty weeks per year; the other of 268 hours, for a course of 32 weeks each year.

Divisions of Subject.	Hours.
A.—Pharmacy, Chemical Toxicology and Elementary Prescription Writing	35
B.—Experimental Pharmacodynamics	50
D.—Systematic Pharmacology, with Prescription Writing	70
E.—Non-Pharmacal Therapeutics	10
F.—General Therapeutics with Prescription Writing	45
G.—Therapeutic Clinics with Prescription Writing	30
Total hours	240

NOTE.—Course G is really a medical course, but should preferably be classified under the department of therapeutics.

Chapter V—Prerequisites

The committee was instructed to report on the subjects prerequisite to its courses. These are, briefly, as follows:

ENTRANCE SUBJECTS

Latin.—Desirable, but not indispensable, for prescription-writing.

Modern Languages.—Desirable, as for any other department.

Botany.—Desirable, but not indispensable.

General Inorganic Chemistry and Qualitative Analysis.—Indispensable for understanding pharmacology and for learning incompatabilities.

Physics.—A fair training in the theories and methods of Physical Chemistry is also very desirable.

MEDICAL SUBJECTS

Organic Chemistry.—This should precede the courses in Materia Medica and didactic Pharmacology.

Physiology.—This should precede Pharmacodynamics.

Pathology.—This should precede the courses in Therapeutics.

The relation of the courses in this department to the later portions of the curriculum has already been discussed and need not be repeated.

Chapter VI—Qualifications of the Instructors

The subjects assigned to your committee pertain partly to the laboratory and partly to the clinical side of medicine. With the present development of these subjects they can

scarcely be represented with success by one man. They therefore require several instructors, and in view of the importance of the subjects, it is desirable that both the laboratory and clinical side should be recognized by professional rank. Close cooperation is, however, indispensable and this can usually be best assured by placing the entire department under a single directing head. It is a minor matter, subject to local conditions, whether the director or chairman of the department be primarily a laboratory or a clinical man so long as he has sufficient breadth and training to understand and appreciate the two sides of the subject and will give the time and thought required to properly plan and correlate the courses, and to secure well-planned, well supervised and well-executed, systematic instruction.

Here, as elsewhere, it is highly desirable if not indispensable, that the man responsible for the teaching of the laboratory branches should be adequately paid so that he can give the large amount of time necessary, more especially since such work does not yield any other financial return, direct or indirect. If possible, he should be paid for his entire time and he should not be overburdened with teaching. On the contrary he should be chosen for his demonstrated ability to do research, as well as teaching. Facilities and opportunity for research should be provided for him so that he may benefit at once his teaching and his branch. A well-trained pharmacologist can easily take supervisory charge of the work in pharmacy, toxicology, and the other laboratory subjects of the department. If he gives the laboratory courses which were advised in Chapter III he should be furnished with sufficient assistants to make the courses effective. This is particularly important in the course in pharmaco-dynamics. In this course one instructor for every twelve students seems to give the best results. Whether these assistants should also be remunerated so as to give their whole time to the department, must depend, of course, on local conditions. It is highly desirable that there should be at least one paid assistant in the department, while other assistants may with some advantage be drawn from the clinical men who are especially interested in therapeutics. "Student-assistants" are not a satisfactory substitute for graduate assistants in teaching although there may be exceptions.

The necessary qualifications of the clinical staff of the department are self-evident. One important qualification is, that they should not only have the ability, but also the time and inclination for conscientious and effective teaching. They should therefore hold therapeutics as their main teaching appointment. Besides the senior clinician who should have the responsibility, especially of the didactic instruction, there should be a group of younger men for demonstrating and detail teaching. It would be most desirable if men could be ob-

tained for this purpose who are trained and interested in both laboratory and clinical methods of working and thinking. This would tend toward the closer correlation in the applied and scientific teaching, which is perhaps the most conspicuous deficiency in modern medical education.

It needs scarcely to be mentioned that the therapeutical clinics should be intrusted to those medical men who have a real and scientific interest in therapeutic questions. The non-pharmacal therapeutics should also be placed in charge of an instructor who not only knows the subject but who can and will arrange for demonstrations in massage, hydrotherapy, electricity, etc.

Chapter VII—Equipment

The general equipment is practically identical with that required for chemistry and physiology and if necessary the same rooms and apparatus may be utilized. This, however, is doubtful economy; for, besides the greater wear and tear on the apparatus when it is used in two departments, no course can be developed to its maximum efficiency if it has to be given in borrowed quarters with borrowed apparatus.

Speaking, then, of the desirable rather than indispensable equipment, it does not seem worth while to go much into details. Where there is a man capable of laboratory teaching, he knows best what equipment he requires, and he may often accomplish good results with very simple facilities; and where there is no such man, the most elaborate equipment would be simply so much wasted. Certain apparatus are, of course, indispensable in every course. This would include a collection of materia medica specimens, both the crude drugs and preparations in so far as they are important (lists A and B of Appendix A) and rather simple and inexpensive chemical and pharmaceutical apparatus (balances, graduates, percolators, spatulas, mortars, funnels, etc.). For the animal work, the most essential equipment consists in the animals. There should also be apparatus for experiments on blood pressure and respiration as well as manometers, kymographs, induction coils, levers, etc. In one phrase there should be sufficient apparatus of adequate quality, "to enable each student to carry on the work of the department intelligently and successfully." There should also be sufficient room and apparatus for research and finally there should be easy access to a library with files of the technical journals and reference works in pharmacology, physiology, chemistry and pharmacy.

Respectfully submitted,

TORALD SOLLMANN, Chairman.

Appendix A

TABLE OF MATERIA MEDICA

Explanatory:—It is obviously impossible for the student, with the limited time at his disposal, to master all the drugs and preparations which have been used at one time or another. Indeed, to instruct him thoroughly in the really important drugs, in a course of reasonable extent, it is necessary that the instructor should practice careful selection. The committee hopes that the following list may prove valuable as a guide and aid to secure some degree of uniformity. It is not to be expected that this list coincides completely with the opinions of every teacher of the subject, but it may be hoped that the greater part of it will secure acceptance and thus be of some use. It is hoped, especially, that the State Examining Boards will consent to confine their questions to the drugs and preparations of column A. These will surely suffice to test a candidate's knowledge of the subject. The state boards would thereby not only lighten the load of the student but would also help materially the cause of thorough and sound instruction.

In this list the drugs have been arranged in two columns. Column A contains the important items, which are to be studied exhaustively. Column B contains drugs which are unimportant (at least relatively) but which, for one reason or another, deserve brief mention.

With each drug are named the most important preparations, and when a drug is not commonly administered in the crude shape, it is mentioned only in the form of its preparations. It is expected that the origin and composition of the drug be described under this preparation, if the study-outline (Appendix B) is used.

It needs scarcely to be mentioned that the committee attaches no importance to the sequence in which the drugs are here presented; this being a matter of which each instructor is the best judge, so far as his own course is concerned.

SCHEDULE OF MATERIA MEDICA

COLUMN A: IMPORTANT and to be studied thoroughly:	COLUMN B: UNIMPORTANT (at least relatively), but requiring brief mention.
	COLORS:
	Persionis, Tr. Persionis, Tr. Comp.
	FLAVORS:
Saccharum	Benzosulphinidum
Syrupus	Glycyrrhiza (Fluidextr. and Extr.)
Syrupus Glycyrrhizæ	Elixir Adjuvans
Menthæ Piperitæ (Aqua and Spir.)	Cinnamomi, Aqua
Elixir aromaticum	Rosæ, Aqua.
	Gaultheriæ, Spir.
	Zingiberis, Tinct.
	Lavandulæ, Tr. Comp.
	Acidi Citrici, Syr.
	Aurantii, Syr.
	Sarsaparillæ, Syr. Comp.
	Tolutanus, Syr.
	INORGANIC IRRITANTS:
Sulphur Lotum	Sulphuris, Ung.
Ichthyol	Glycyrrhizæ, Pulv. Comp.
	Calx Sulphurata
	Calx Chlorinata
Iodi, Tinct.	Chlori Liq. Comp.
Iodoformum	Iodi, Liq. Comp.
Hydrogenii Dioxidi, Aqua	Thymolis Iodidum
	Organic Peroxids
	VEGETABLE ASTRINGENTS:
Acidum Tannicum	Ac. Tannic., Glyceritum and Ung.
	Tannin-Proteins
	Gambir, Tinct. Comp.

HYSTERIC SEDATIVES:

Asafœtida	Asafœt., Pil.
	Valerianæ, Tinct. Ammon.
	Ammonii Valeras

ORGANIC COUNTER-IRRITANTS:

Terebinthinæ, Oleum	Terpini Hydras
	Arnicæ, Tinct.
	Hamamelidis, Aqua
	Balsamum Peruvianum
	Benzoini, Tinct. Comp.
	Myrrhæ, Tinct.
Copaiba	Cubebæ, Oleum
Santali, Oleum	Eucalypti, Oleum
	Juniperis, Spir. Comp.
	Buchu, Fluidextra.
	Sinapis, Charta and Spir.
	Thiosinamin
Cantharidis, Cerat.	
	Capsici, Tinct.
	Chrysarobinum

ABORTIFACIENT OILS

(Sabina, Tanacetum, Ruta, Hedeoma)

BITTERS:

Gentianæ, Tinct. Comp.	Gentianæ, Extr.
	Calumbæ, Tinct.
	Quassiæ, Tinct.
	Cardamomi, Tinct. Comp.

VEGETABLE CATHARTICS:

	Senna (and Fluidextr. and Infus. Comp.)
Rhei, Syr. Arom.	
Rhamni Purshianæ, Elixir and Fluidextr.	Rhei, Tinct. Arom.
	Aloes, Pil.
Jalapæ, Pulv. Comp.	Aloin
Podophylli, Resina	Pil. Laxativa Comp.
Ricini, Oleum	Pil. Cathartica Comp.
	Pil. Cathartica Veget.
	Phenylphthalein
	Elaterini, Trituratio
	Tiglii, Oleum
	Guaiaci, Tinct.
	Fel Bovis Purif.
	Bile Salts

ANTHELMINTICS:

Aspidii, Oleoresina	Thymol
Pelletierinæ Tannas	Santoninum
	Santonini, Troch.
	Pepo

EMOLLIENTS:

Oleum Olivæ	Oleum Gossypii
Glycerinum	Suppositoria Glycerini
Petrolatum (also Album and Liquidum)	Unguent. Aquæ Rosæ
	Resina
Oleum Theobromatis	
Adeps Benzoinatus	
Adeps Lanæ Hydrosus	

DEMULCENTS:

Acacia (and Mucilage)	Tragacantha
	Amylum
	Gelatinum

MECHANICAL:

Collodium Flexile	Emplastrum Adhesivum
	Linum Contusum
	Cataplasma Kaolini
	Lycopodium
	Talcum
	Gossypium Purificatum
	Calcii Sulphas Exsicc.
	Liquor Sodii Silicatis
	Hirude

DIGESTANTS AND NUTRIENTS:

Oleum Morrhuæ (and Emulsum)	Pepsinum (and Glyceritum) Pancreatinum Papainum Diastase Extract. Malti Vinum Ferri et Carnis

ALKALOIDAL DRUGS:

Strychninæ Sulphas Nucis Vomicæ, Tinct.	Elixir Ferri, Quin. et Strychn. Phosph. Extract. Nucis Vomicæ
Caffeina Citrata Theobrominæ Sod. Salic.	Caffein Beverages Theophyllin
Opii, Pulvis, Tinctura, and Tinct. Camph. Pulvis Ipecac. et Opii Morphinæ Hydrochlorid. Codeinæ Phosphas	Tinct. Opii Deodorata Lotio Plumbi et Opii Morphinæ Sulphas Heroinæ Hydrochlorid. Dionina
	Cannabis Indicæ, Extr. and Tinct. Hydrastis, Tinct. and Glyceritum Hydrastnæ Hydrochlorid.
Cocainæ Hydrochlorid.	Eucainæ Hydrochlorid. Other Cocain Substitutes Orthoformum
Atropinæ Sulphas Scopolaminæ Hydrobromid. Homatropinæ Hydrobromid.	Hyoscyaminæ Hydrobromid. Belladonnæ, Tinct., Extr., Linim., and Emplastr. Strammonium
Pilocarpinæ Hydrochlorid. Nicotina Physostigminæ Salicylas	Muscarine Poisonous Fungi Ptomains Curare Conii, Fluidextr. Gelsemii, Tinct. Lobeliæ, Tinct. Sparteinæ, Sulphas Scoparius
Apomorphinæ Hydrochlorid. Ipecacuanhæ, Syrup. and Pulvis	Senegæ, Syrupus
Aconiti, Tinct.	Aconitina Colchici Sem. Vinum Veratri, Tinct. Veratrina
Quininæ Hydrochlorid.	Quininæ Sulphas and Bisulphas Cinchonæ, Tinct. Comp. Cinchonidinæ Sulphas

BENZOL DERIVATIVES:

Acetphenetidinum Acetanilidum	Antipyrina
Sodii Salicylas	Acid. Salicylicum Acid. Acet-salicylicum Methylis Salicylas Salicinum
Phenol and Liquefactum Phenylis Salicylas Resorcinol Creosotum	Phenolis, Glycerit., and Unguent. Phenylsulphonates Cresolis, Liq. Comp. Pyrogallol Guaiacolum and Carbonas

	Pix Liquidum and Syrup.
	Liquor Antisepticus and Alkalinus
	Methylthioninæ Hydrochlorid.
	Acidum Picricum
	Acidum Benzoicum
	Sodii Benzoas
	Betanaphthol
	Naphthalinum
BIOLOGIC PRODUCTS:	
Epinephrin	Gland. Suprarenales Siccæ
Gland. Thyroideæ Siccæ	Other Organ Extracts
	Nuclein
	Lecithin
Serum Antidiphtheriticum	Other Sera and Vaccines
Serum Antitetanicum	
Vaccina Variolæ	
HYDROCARBON NARCOTICS:	
Alcohol	Alcohol Dilutum
Spiritus Frumenti and Vini Gallici	Alcoholic Beverages
	Alcohol Methylicum
Æther	Ætheris, Spiritus
Chloroformum	Chloroformi, Spir., Aqua, and Linim.
Æthylis Chloridum	Æthylis Bromidum
	Methylis Chloridum
Nitrogen Monoxid	Bromoformum
Chloralum Hydratum	Sulphonethylmethanum
Sulphonmethanum	Veronal
	Chlorbutanol
	Æthylis Carbamas
	Paraldehydum
	Other Synthetic Hypnotics
Formaldehydi, Liquor	
Hexamethylenamina	
NEUTRAL PRINCIPLES:	
Digitalis, Pulvis and Tinct.	Digitalis, Infusum.
	Digitoxin
	Digitalin
Strophanthi, Tinct.	Other Digitalis Substitutes
Strophanthinum	Scillæ, Syr. Comp.
	Picrotoxinum
Ergotæ, Fluidextr.	Ergotæ, Extr.
	Viburni Prunifolii, Fluidextr.
	Quillaja
SUNDRY:	
Camphoræ, Spir. and Linim.	Acid. Camphoricum
	Acidum Agaricum
	Menthol
Acidum Hydrocyanicum	Potassii Cyanidum
	Pruni Virginianæ, Syrup.
Glycerylis Nitratis, Spirit.	Erythrolis Tetranitras
Amylis Nitris	Spir. Ætheris Nitrosi
	Sodii Nitris
Oxygen	Carbon Monoxid
	Carbon Dioxid
	Other Toxic Gases

SALINES:	
Sodii Chloridum	Urea
Magnesii Sulphas	Sodii Sulphas
Magnesii Citratis, Liquor	Sal Carolin. Factit.
Sodii Phosphas	Potas. et Sodii Tartras
Saccharum Lactis	Potassii Bitartras
	Pulv. Effervescens Comp.
Ammonii Chloridum	Ammonii Acetatis, Liquor
Calcii Chloridum	Calcii Lactas
	Barii Chloridum
	Strontii Bromidum
Potassii Bromidum	Other Bromids
Potassii Iodidum	Other Iodids
Potassii Acetas	Potassii Citras
Potassii Chloras	Potassii Nitras
Potassii Permanganas	Lithii Citras
Sodii Boras	
Acidum Boricum	Glycerit. Boroglycerini
ALKALIES:	
Ammoniæ, Aqua	Ammoniæ, Liniment.
Ammonii Carbonas	Potassii Hydroxidi, Liquor
Ammoniæ, Spirit. Aromat.	Sodii Carbonas
Sodii Bicarbonas	Potassii Carbonas
Creta Preparata	Syrupus Calcis
Liquor Calcis	Magnesii Carbonas
Liniment. Calcis	Magnesii Oxidum
	Sapo
	Liniment. Saponis
ACIDS:	
Acidum Hydrochloricum Dilutum	Acid. Nitrohydrochloric. Dil.
	Acid. Nitricum
	Acid. Phosphoricum Dil.
	Acid. Sulphuricum Arom.
	Acid. Aceticum Dil.
	Acid. Citricum
	Acid. Oleicum
	Acid. Trichloracet.
	Acid. Oxalicum
METALS:	
Arseni Trioxidum	Liquor Arseni et Hydrargyri Iodidi
Potassii Arsenitis, Liquor	Sodii Cacodylas
	Atoxyl
Antimonii et Potassii Tartras	Vinum Antimonii
Bismuthi Subcarbonas	Bismuthi Subnitras
	Bismuthi Subgallas
	Bismuthi et Ammonii Citras
Ferrum Reductum	
Pil. and Massa Ferri Carbonatis	Ferri et Ammonii Citras
Ferri Sulphas Exsiccatus	Pil. Aloes et Ferri
Syrup. Ferri Iodidi	Organic Iron Preparations
Tinct. Ferri Chloridi	Mangani Dioxidum Precip.
	Chromii Trioxidum
	Potassii Dichromas
Alumen	Ceril Oxalas
Argenti Nitras	
Organic Silver Preparations	Auri et Sodii Chloridum
Cupri Sulphas	
Zinci Sulphas	Zinci Chloridum
Zinci Oxidi, Unguent.	Zinci Stearas
Hydrargyri, Massa	Lotio Nigra and Flava
Hydrargyri, Ung. and Ung. Dil.	Ung. Hydrargyri Oxidi
Hydrargyri Chloridum Corrosivum	Ung. Hydrargyri Nitratis
Hydrargyri Chloridum Mite	Hydrargyri Iodidum Rubrum
Hydrargyri Iodidum Flavum	
Plumbi Acetas	Liquor Plumbi Subacetatis Dilutus
Phosphorus	Emplastrum Plumbi
	Pil. Phosphori
	Hypophosphites
	Glycerinophosphates

TABULATION OF MATERIA MEDICA.

Latin Name and Synonym.	Average Dose U. S. P.		Origin :— Part Used. Important Constituents.	Physical Characters :— Appearance. Odor. Taste.	Miscibility or Solubility.		Remarks.
	Metric.	U. S. System.			Water.	Alcohol.	

SECTION V.—REPORT OF THE SUB-COMMITTEE ON INTERNAL MEDICINE

This committee has carried on an extensive correspondence, and on the whole with a rather surprising agreement. In submitting this report it should be remembered that it is not supposed it will be binding, or "ideal" for any or all schools. Some members would have preferred suggesting a minimum schedule, but it seemed better to arrange a plan that could be followed as a working scheme in the best schools. In order to prevent a misunderstanding of the suggestions, we call attention to the words of one of the committee (Dr. Christian), expressing views that were set forth in many of the original individual plans: "Our medical schools should seek to graduate students trained in certain methods and capable of intelligently practicing medicine. Their license examinations should determine this. This end can undoubtedly be attained by numerous ways of dividing the time between the various subjects. Not so much what the man has studied, but how well he has studied fits him for the test. * * * For the upbuild of medical education investigation as to how well a medical school does what it claims to do is far more important than dictating to it what it should claim to teach. We all realize that the medical school that actually does well all it claims in its catalogue is very uncommon. So we make a plea for much elasticity of requirements, but ask that schools be held to a high standard of actual accomplishment, and that it be definitely and repeatedly stated that it is not the intention of these committees to form a standard curriculum for medical schools and so remove the opportunity of progressive and enlightened change in methods of instruction, and diminish freedom of student election, which is now to small in our medical schools."

1. Place in the Curriculum.

The time to begin the study of internal medicine is in the second year, in the last half, or in schools with more advanced entrance requirements, the beginning of the second year.

2. Prerequisites.

The minimum work in physiological chemistry should be 75 hours; in bacteriology, 75 hours and in pathological histology, 150 hours.

3. Laboratory Equipment.

Each student in the third and fourth years should have his own locker, laboratory table (place), microscope with three lenses and mechanical stage, blood-counter, hemoglobinometer, reagents and dyes and all utensils commonly used in routine work, the details of which need not be given, as they will vary with different teachers. There should be a supply room in charge of a competent clerk, who may with advantage be a technician, where the student may get, on requisition, any other apparatus needed in his work. Some of the apparatus thus available should be kept in several examples, *e. g.*,

Miescher hemoglobinometers or others not in the hands of each student. There should be a budget from which new instruments can be ordered at short notice, and if there is a University mechanician he should also be available for the construction of such pieces as may be devised by those working in the laboratory.

4. Clinical Facilities.

The opinions of members of the committee have obviously been influenced by the meagre and often unsatisfactory conditions hitherto characteristic of medical teaching in America, especially in bedside and non-operative work, and the answers show demands that would be considered miserably inadequate in European medical schools.

The minimum should be one patient for each two clinical students, or 100 medical patients, not including pediatric, nervous and mental diseases, for a school having 100 in each class, or 200 in the last two classes. It should be required that a hospital depended upon for the clinical teaching of a medical school should have not less than 300 beds, should be general as to classes of disease, admitting under proper conditions all kinds of infectious diseases, including tuberculosis and the exanthemata, and free to admit gratis impecunious patients with conditions useful for teaching. An out-patient service, with examining rooms and an adequate staff should be at the disposition of the medical school.

Both hospital and out-patient department should have laboratories well equipped for all necessary instrumental examinations and bacteriological investigations.

5. Methods of Teaching.

It is freely admitted at the outset that various methods will give good results. Variations may be demanded not only by the opinions of the teacher or faculty, but still more by clinical and other material facilities. Certain details of method will be discussed again. The course will be described by years.

SECOND YEAR.

Physical Diagnosis.—In the last half, or earlier, the principles of Physical Diagnosis should be taught either by lecture or recitation, with demonstrations and practical exercises on the normal subject. Besides learning the technic of physical diagnosis, the student should have his attention directed to the regional anatomical, physiological and pathological relations of the subject. Special work in Experimental Physiology or Pathological Chemistry may be taken if there are facilities for doing so. Dr. Musser has suggested a course in Medical Correlation that should be of great value at this time.

Courses in Medical Terminology have been advocated by some teachers at the beginning of clinical work. We believe these are not necessary as formal courses but recommend that in each course attention should be paid to full and accurate knowledge of the special terminology, and the use of a good dictionary insisted upon.

We also see no necessity or advantage in elementary courses in Internal Medicine. Students who have studied Pathology, Bacteriology, and the subjects now required for entrance should not need these, and the use of compends is not to be recommended. In schools with higher entrance requirements Physical Diagnosis should be begun in the beginning of the second year, and some of the courses mentioned below, especially ward work in elementary diagnosis, should be entered upon by the middle of that year.

THIRD YEAR.

Internal Medicine, "Theory and Practice," should be begun in the third year, except in schools with advanced entrance requirements as mentioned above. The more important subjects, and most of the total amount, so far as Special Pathology, Symptomatology and Diagnosis are concerned, should be finished in the same year, leaving the fourth year largely to Special Pathologic Anatomy, Diagnosis and Differential Diagnosis, Prognosis and Treatment as seen in actual cases, in the wards and clinics.

Lectures or Recitations.—Whether the elementtary work is taught by didactic lectures or by recitations should be determined by the head of the department on the ground of personal preference or the exigencies of details of the course. The aim in either case is to give the student a general, coordinated, fairly full and accurate knowledge of the most important internal diseases, in the current classification. It does not seem possible to do without one or the other, leaving the student to evolve his own classification from his practical work, as has been urged as an ideal. If didactic lectures are preferred they should be revised so as constantly to be up to date. They must be symmetrical, and not unduly affected in proportion or emphasis by the special interests or tastes of the teacher. Occasional quizzes or informal examinations may be introduced in order to indicate the effect upon the class. If recitations are used there must be no suggestion of a mechanical cram. "Not any bright young graduate can conduct recitations * * * the recitation must be combined with the running accompaniment (exhortation and criticism) of an experienced man." (Dr. Blumer.) An essential is the use of a text-book well revised, containing the fewest possible errors, and in sympathy with the views of the teacher. Those who have used the method are confirmed in the belief in its value not only by the results of college, State board, hospital and Government service examinations, but also by the after work of men so trained. It is especially valuable in stimulating reading of the best kind. It cannot but be admitted that didactic lectures often result in dependence upon notes, either taken by the student and imperfect, or mimeographed, and destructive alike to mind and eyes, or to a "quiz-compend."

This part of the subject may well be summed up in Dr. Blumer's paraphrase of Pope:

> "For forms of teaching let fools contest;
> Whate'er is best administered is best."

Ward Classes in Elementary Diagnosis.—This work should begin in the beginning of the third year, except in schools with advanced requirements, in which it should come in the second year. It should come in the first half of the year if possible, but in many schools it must be spread over the year so that some sections will not get it until the end.

The best method is to have classes of not more than 25 in charge of an experienced teacher, assisted by four or five others who should have at least as much graduate work as would be obtained by a year's service as medical interne, preferably young physicians who wish to perfect themselves in internal medicine. The work should be individual and "practical." Lectures or recitations from text-books are not necessary, but proper text-books should be recommended, and studied out of the class hours. One of the smaller works on Diagnosis may with advantage be carried in the pocket and used in the wards. The reading should be controlled by short informal examinations or quizzes.

The class should be assigned to patients, preferably in-patients. Provided with note-books, cards, or other method as preferred by the teacher, and with skin-pencil and stethoscope, the student should work out, describe, and wherever possible sketch the results of inspection, percussion, auscultation and palpation. Tape-lines, saddle-tapes, cyrtometer, thermometer, hemoglobinometer and weighing-scales should be used when indicated. Teachers and demonstrators should spend most of their time seeing that proper technic is practised, that all the signs in the given patient are recognized and noted, and that time is not being lost by idle talk with the patient, a common pitfall for the beginner. At times, instructive cases may be demonstrated before the section, either to serve as object lessons in technic, to show signs of importance or of rare occurrence, as subjects for a quiz, or other purpose. Interest may be added to the work, often considered tiresome, by making collective investigations, such as the height of the apices in a series of cases, the character of the breath-sounds in various cases and in various parts of the chest, the position and mobility of the heart, position of the nipples, size of the liver and spleen, shape of the abdomen, visceral ptosis, etc. In the beginning, no effort should be made at case-taking in full, but by following a good method that will be acquired in its elementary form, and in the latter part of the course cases may be taken in full. The best results in case-taking can not be expected until the student has had most of his lecture or recitation course.

If there is time and other facilities, the student in his third year should have some training in the out-patient clinic. He can get this very well by acting as amanuensis to a clever out-patient physician, or by doing some of the laboratory work for the same. The students in the section can alternate in the various kinds of work.

The in-patient work should have not less than 30 hours. Six to ten hours in the out-patient work in the third year would do, but it would be an advantage, and save time in the fourth year, to have 60 hours at the work just described.

Clinical Pathology.—This also should be taken in the first half of the third year if possible, but in most schools it will be necessary to take part of the class, say half, for half the year, or all the class the whole year, in alternate sections. Each period should be not less than two hours, the total 60. Two and a half hours makes a convenient period when the light in the laboratory is good.

The object of this course is to give the student "ability to use intelligently and accurately a few of the simpler clinical laboratory methods most essential" in practice. The laboratory equipment has been mentioned above. Instruction should be under the charge of a man who has done and is still doing original work, with ability as a teacher, assisted by others competent to demonstrate all the methods used and objects encountered. One demonstrator to ten or fifteen students should prevent loss of time. Besides learning the technic of routine clinical work, students should be required to draw and describe as many objects as possible. He should also be trained in the handling of apparatus, simple glass-blowing, and the economical use of material, as well as neatness and order. The real standards in end-reactions, the margin of error in reading instruments like the polariscope and hemometer, the color of precipitates, and all matters involving a personal equation, should be made as clear as possible. While the main object should be the acquisition of methods rather than facts, in any well-conducted course the number of facts learned will be large.

As an example of the topics and division of time the following is suggested (based on Dr. W. G. Thompson's plan, reduced to fit the 30 weeks course):

Urine, normal and pathologic, including use of polariscope ..... periods	8
Blood, including spectroscope.....periods	10
Clinical Bacteriology, especially staining and finding tubercle bacilli, diphtheria, typhoid.....	2
Blood Cultures (in several periods).....	1
Sputum	2
Stomach contents, chemical and microscopic.....	2
Feces, including ova of important parasites.....	4
Cytology of exudates and transudates.....	1

From this time on the student should have access to the laboratory, and should be encouraged to do as much work as possible. Students should also be encouraged to have their own microscopes, blood-counters, and other apparatus, in order to get in the way of caring for such instruments. For all apparatus loaned by the college there should be a damage deposit, and a fee sufficient to keep up the loss from wear.

Diagnostic Clinic or Observation Class.—This is a valuable method of teaching elementary medicine and of presenting phenomena to larger groups than is possible in the case of many parts of diagnosis. The course should be given by a teacher of wide clinical experience, good judgment, and patience. An amphi-theater, class-room or even a large ward may be used. Patients showing alterations of color, form, size, physiognomy, speech or expression, of gait or station, easily visible reflexes,

many abdominal tumors, etc., can be studied and time saved for the more minute alterations, and percussion and auscultation, in the smaller classes in the wards. Patients needing such diagnostic or therapeutic procedures as aspiration, bleeding, blisters, etc., may be demonstrated before, during and after the operation, thus combining part of the work in Medical Technic, special courses in which have been advocated by some. Instructive specimens such as sputum, urine, stools and stomach contents can be demonstrated at such times, for the naked eye appearance, with or without the patients furnishing them. Blood preparations from cases of leukemia, pernicious anemia, etc., can be shown by demonstration microscopes passed around. Classes of one hundred can be handled in this way. The didactic-demonstrative method should be used sparingly, the Socratic being most valuable. It is well for the teacher to have a list of the class and to call on members for explanations or descriptions. Problems in anatomy, physiology, chemistry or other lines bearing on points brought out may be assigned for short papers or extempore explanations, in order to stimulate and keep fresh knowledge of those subjects. *E. g.*, in a case of jaundice, the pathology of jaundice; in ascites, the matter of transudation, exudation, collateral circulation in portal obstruction, etc. Third year students may with advantage attend general medical clinics, say once a week.

FOURTH YEAR.

Ward and Clinical Laboratory.—Individual work in ward and laboratory should be the main features of the fourth year. Admitting the value of concentration in some work, in this some regard must be paid to the advantages to be derived from long periods, so as to get the greatest variety of cases. A useful arrangement gives one-third of the available time to medicine, one-third to surgery, each with its correlated branches, and one-third to special branches. Continued attendance at medical and surgical clinics ensures wider range of material than can be seen in the trimester.

The mornings of week-days, three hours each, for ten weeks should be devoted to work by the student in the ward and laboratory, say two hours, and with an instructor who should look into the quality of the work in all particulars and suggest detail for further work in the last hour. The teacher will modify his work to meet the exigencies of material and teaching, making formal rounds, having students demonstrate patients and specimens, suggesting or showing interesting books or articles bearing on cases, carrying out treatment, such as the mechanical kinds, applying diagnostic or therapeutic apparatus, etc.

Clinics.—Three hours a week should be devoted to medical clinics in the fourth year, attended by all the class. An hour and a half is a better time for this than an hour. One hundred is perhaps the ideal maximum size for a class of this kind, but up to two hundred can be instructed if little time is spent on things that cannot be seen or heard at a distance.

The method of conducting the clinics will vary with the inclinations of the teacher and the nature of the clinical

material. As there seems to be some difference of opinion or rather of meaning regarding the term Clinical Conference, recommended by some, it may be said that some teachers apply this to a method used with success by many teachers, especially by some of the greatest German clinicians, and illustrated by Dr. Byrom Bramwell's published clinical lectures. The technic and bearing of case-histories can readily be taught to large classes in this way. Patients may be examined, demonstrated, and their cases discussed by any combination of inductive, Socratic or didactic methods, and all the special pathology, differential diagnosis, prognosis and treatment can be given as briefly or as exhaustively as seems desirable. It can be used exclusively without distinct loss, but may be varied or added to by a more didactic clinic. There is a general unanimity in the committee as to the belief that in clinical lectures actual patients should furnish the text.

Out-patients may be used with advantage for some of the clinics or clinical conferences. In addition, the student should spend an hour a day for thirty days in an out-patient department, making examinations, keeping records, and being taught by the physician in charge and his staff. The service should not be larger than is consistent with good work, and usually will not be if the latter is given, on account of the time required of the patient. If the service is large there should be many rooms in which the students may begin the examinations. The necessary instruments and reagents must be easily available.

Clinical Committees or Clubs.—Sections of the class may with advantage take up the collective study of cases, or all students working on patients with the more important diseases may form themselves into committees for the purpose, i. e., pneumonia, typhoid fever, malaria, tuberculosis, cancer of the stomach, intestinal parasites, etc., may be worked up each year, and the students encouraged to write papers bearing on each topic.

Didactic Lectures.—Where material is not sufficient to give the ward work as recommended, a course of lectures may be given in the 4th year on some special subject, such as "Diseases of the Ductless Glands or other topics undergoing such rapid change that they are not properly covered in the text-book" (Dr. Thompson).

The case method may also be utilized if there is time and lack of patients. Cases studied by the teacher conducting the course, or in the same hospital, with good histories, if possible autopsy notes and specimens, can be used, or classical cases from the literature, such as those of Addison on pernicious anemia or Addison's disease, Bright on nephritis, Zenker on trichiniasis, Parry or Graves on exophthalmic goitre, Marie on acromegaly, Virchow or Bennett on leukemia, etc.

Therapeutics should be taught especially in the wards and clinical conferences, in connection with actual patients. Students should be required to describe treatment in full in their histories, and to write prescriptions on the blackboard ex tempore in the discussion of cases. The actual treatment in

the services should be as temperate as possible, in order to make easier the recognition of effects.

A therapeutic clinic, given by one with training in pharmacology, would be useful, and masseurs could be called upon at times to show special details of their work.

An effort should be made to see that each class see new apparatus for diagnosis and treatment, with some indication of the probable value of the same in scientific investigation and in practical medicine.

Special courses have no place in the crowded curriculum at present. Where there are teachers with time and inclination to offer such courses, and students with time to take them, they should be encouraged. Extra-mural and especially summer courses should be encouraged also, including courses in contagious disease hospitals, tuberculosis sanatoria, and sea-side hospitals.

"Research is not for the average student until after graduation. Some exceptional men can do it, and should have every assistance, but most must confine themselves to regular work." Students who have time can always find facilities for perfecting themselves in clinical or laboratory work, and can often get more out of such work than in so-called original investigation. "Electives furnish a means and a valuable incentive for men to try teaching in special lines, and they give an index of how well the efforts of these teachers are appreciated by students" (Dr. Christian). It will be a great advantage for American medicine when free teachers are given place and time for classes, not only thereby utilizing clinical material now lost, but also providing a stimulus now lacking, and so characteristic of the best European schools.

Neurology and Psychiatry.—Dr. Dercum suggests the following desiderata: Nervous morphology and physiology in the first and second years, the exact number of hours to be determined by the heads of departments in those lines. Neuropathology, gross and microscopic, in the third year. In the same year, clinical conferences on neurology. In the fourth year, bedside and out-patient work; clinical conferences and demonstrations on insanity; electro-therapeutics and electro-diagnosis; neurologic clinic; didactic lectures on nervous and mental diseases. See hours below.

Pediatrics.—The plan of Dr. Holt is recommended in general. The division of certain subjects, such as the acute infectious diseases may be based on material, so that if the Pediatric department has control of a special hospital for the exanthemata it might give most of the work in those lines. But a certain amount of repetition is an advantage, and in any event the internal medical department should consider such diseases as measles, varicella, whooping cough, diphtheria and meningitis.

Comments on Time.—At the meeting of chairmen of committees and of the Council on Education, it was agreed that a 4,000 hour schedule was not too long, and should be followed in the elaboration of the plans. It was also agreed that Medicine, Neurology and Pediatrics should have 950 hours.

The hours are clock hours. The differences in intensity of work in different courses cannot be considered in arranging a schedule. As Dr. Dercum says, courses cannot be valued by their hours alone.

The necessity for "time to think" is obvious, but it is noteworthy that the member who emphasized that most strongly also said that 1,000 hours a year were not too many. It is also important to remember that in a course like the one now submitted thinking can be done while working in the wards or laboratories, as well as a certain amount of reading, and there is no possibility of overworking a student of moderate strength, by enforcing it. Many schools now require longer hours. Time to read, at night, is ample.

Schedule.

TIME	SUBJECT	TOTAL HOURS	
Second Year.	Diagnosis	45	45
Third Year.	Lectures or Recitations	90	
	Ward Classes	60 or 30	
	Clinical Pathology	75 or 60	
	Diagnostic Clinic	30	
	Advanced Clinic	30	240
	Neurology.—Neuropathology	25	
	Clinical conferences	30	55
	Pediatrics.—Recitation	30	
	Physical Diagnosis	15	
	Didactic lecture	15	
	Clinical lecture	30	
	Contagious diseases	10	100
Fourth Year.	Didactic lecture, Case method or Recitation	30	
	Ward and clinical laboratory	150 or 180	
	Clinics or clinical conference	90	
	Out-patient	30	330
	Neurology.—Bedside and Out-patient	10	
	Clinical conferences on Insanity	15	
	Electro-diagnosis and therapeutics	15	
	Neurological clinic	30	
	Didactic lecture, neural and psychiatric	30	100
	Pediatrics.—Didactic lecture	15	
	Clinical lecture	30	
	Clinical conference	30	
	Diet laboratory	3	
	Intubation	2	80
	Grand Total		950

6. Special Courses.

Special Courses in neurology, psychiatry and pediatrics are desirable on account of the students who look forward to work in special hospitals, and on account of the necessary limitations of the regular course. Such courses might be open to graduates who have had the requisite preliminary training.

7. Number and Qualifications of Teachers.

The number will depend upon local conditions and no definite general rule can be given. Where many of the teachers are paid enough to devote most of their time to their work of teaching and to research, a small staff can suffice. Something will depend upon the organization and equipment of the hospital. Expert assistants supported by the hospital, or students who do much of the hospital work, may lessen the number of teachers otherwise necessary.

Organization.—The work in Medicine in the strict sense should be under the charge of a full professor, responsible for the conduct of the courses in his department, and with corresponding authority to make recommendations for appointment and to dismiss for cause.

There should be other teachers with titles such as "associate professor, "assistant professor," or "professor of clinical medicine," "clinical pathology." etc., whenever the teaching positions are occupied by men who deserve such titles, and in adequate numbers. Other grades might have titles like "instructor," "demonstrator," "assistant." Proper organization would ensure in each department democracy without friction.

The qualifications of professors of all ranks should be experience and ability in teaching, sound training, original work, high character, enthusiasm, and ability to lead. In the junior teachers sound training, special work and original investigation, and promise of ability to impart knowledge should be required. Promotion should be for merit first and never for length of service alone. "A good method is to let an assistant understand, when he starts in, that he is to be an assistant for a certain period of years, say five, provided he makes good, and that at the end of five years, if he has made good, he will be rewarded by an instructorship. If his work does not justify such promotion it is high time he was dropped. More rapid promotion should be allowed for special merit. Better salaries for all teachers in clinical work are necessary for improvement. . . . The mere title, with the multiplicity of teachers, has made the positions less desirable. The honor should be enhanced by better salaries and by creating the feeling that work well done will bring promotion."

Where the size of the school or the clinical material warrant, the departments of Neurology, Psychiatry and Pediatrics should be in charge of full professors, with adequate staffs under them. It does not seem important whether such teachers should have even a nominal connection with the chair of Medicine, provided the title does not carry the right to unlimited hours of required work. In small schools the departments in question, or one or more, might be under charge of a teacher of lower rank, but no one should be appointed unless he gives promise of deserving the title of professor, which should be given as soon as the work justifies it.

8. Library, Museum, etc.

Every medical school should have a library freely accessible to undergraduates. It should be well supplied with works of reference, dictionaries, encyclopedias, monographs and the more important periodicals. A well-chosen collection of works

on the History of Medicine, Medical Biography, and some on Deontology should be available.

A well-arranged museum should also be part of every medical school, and students should be encouraged to use it.

Charts, lanterns, etc., need no particular mention. Their number, variety and use must vary with the inclinations of teachers. It would be well for the school to have a fund, aside from the library budget, out of which useful or even promising material in these lines could be secured as needed.

Respectfully submitted,

GEORGE DOCK, Chairman.

SECTION VI.—REPORT OF THE SUB-COMMITTEE ON GENERAL AND SPECIAL SURGERY

Preamble

In considering plans for a course of instruction in the division of surgery the committee wish it to be clearly understood that the curriculum proposed is intended to train general practitioners, not to make specialists. In the words of one of the members, "the curse of the country is unbaked specialists." It should be the aim and object of surgical teachers to impress upon students that upon graduation they must not consider themselves prepared to undertake the practice of surgery first until they have served as an interne in a general hospital, and secondly until they have had several years of experience at the operating table as an assistant to a general surgeon. The committee suggests that the time is now at hand when some such regulations should be enacted by the Boards of Medical Examiners in the various states. The number of young men engaged in surgery without proper preparation is surprisingly large and for the protection of the community the boards of Medical Examiners should adopt the proposed regulations governing the practice of surgery. To this general rule there may be certain exceptions; as in the case of sparsely settled communities where the general practitioner may be called upon to perform certain emergency operations; as for example, tracheotomies and amputations.

I. Place of the Subject in the Curriculum

With the exception of certain preliminary courses it is the consensus of opinion that the course of surgical instruction should be confined to the third and fourth years. The work of the third year may, however, be anticipated by certain preliminary courses such as those in bandaging, surgical physiology and possibly surgical pathology.

II. Preliminary Courses

That there may be no duplication of subjects and the strictest economy of time those in charge of the course in the fundamental subjects, anatomy, physiology, bacteriology and pathology, should whenever possible call attention to such phases of the subject as have a direct application to surgical problems. Upon this point the committee wishes to lay great

emphasis. The committee is not in sympathy with the growing tendency of the times to teach these subjects as pure sciences without consideration of their practical bearing.

1. *Surgical Bacteriology.*—This subject should be fully covered in the general course in bacteriology.

2. *Surgical Anatomy.*—The majority of the committee is of the opinion that there should be no necessity of providing for this subject as a special course. It should be left to the chair of anatomy and to the course in operative surgery. It has been suggested that during the regular course in anatomy a member of the surgical teaching staff might to advantage be called upon as each region or system is covered to emphasize these points which bear directly upon surgical diagnosis, fractures and dislocations. No objection is offered to the organized courses in applied anatomy as now given in certain schools, providing that not more than 30 hours are devoted to the subject.

3. *Surgical Pathology.*—The courses in surgical pathology as now conducted in some of the best schools are regarded as invaluable. These courses include demonstrations, both laboratory and clinical, of the most important surgical lesions, for example:

1. Repairs of various tissues, wounds, bones, nerves, tendons, etc.
2. Abscess, ulcer, sinus and fistula.
3. Surgical lesions of the lymphatic system.
4. Surgical lesions of the articulations.
5. Surgical lesions of the osseous system (especially osteomyelitis and tumors).
6. Surgical lesions of the thyroid, mammary and salivary glands.
7. Surgical lesions of the digestive tract.
8. Surgical lesions of the urinary and genital tract.

4. *Surgical Physiology.*—While unnecessary duplication of subjects should be avoided, under existing conditions, a short course (not exceeding 20 hours) with laboratory demonstrations could be given to advantage. Such a course might include the problems in physiology as applied to shock, hemorrhage, anesthetics, thoracic surgery, surgery of the stomach, etc. It would be ideal were the departments of physiology and surgery so correlated that these subjects could be covered in the regular course in physiology.

As to the *selection* of *instructors* for *laboratory courses* it was the sense of the committee that the clinical significance of the laboratory branches be emphasized by the appointment of "*clinical* associates." These should be chosen when possible from those clinical instructors who may be doing laboratory research, or at least who have done such and who are in sympathy and in touch with the experimental side of medicine.

III. Clinical Facilities

The committee wishes to emphasize the desirability of each school having at least one hospital, if not more, in which the affiliations are so close that the school has the privilege of nomination for staff appointments and its students access to the wards and out-clinics. The committee wishes to be put on record further as believing it to be of mutual advantage to the school and the hospital that the students should be

utilized as dressers and clerks in both wards and out-patient departments.

It is obviously difficult to express in numerical terms what should be considered "adequate" clinical facilities. Thus, for example, it is not practical to base the estimate upon the number of beds per student, as a very small class should have the benefits of just as varied a service as a large class and such a service can be obtained only in a large general hospital. A conservative requirement would be as follows: (a) Out-patients; a daily attendance of 50 to 100 patients; (b) Hospital beds; a hospital of not less than 250 to 300 beds, general as to the classes of diseases and free to admit gratis patients with conditions useful for teaching. (The latter requirement is taken from the report of the Committee on Medicine.)

One of the committee does not approve of the specifications as to the size of the hospital, believing the requirements too high, and another believes no attempt should be made to specify as to the number of beds.

IV. Number and Qualifications of Teachers

The number of teachers required to conduct the course will vary according to the size of the classes and to other conditions. A school having under its own control a large and general hospital will not require as many teachers as one largely dependent upon a number of extramural hospitals. In the latter instance the teaching staff must be enlarged to ensure continuous service throughout the year in the wards and out-patient departments. When certain of the staff are paid enough to enable them to give most of their time to teaching, a smaller staff will suffice.

As a rule, there are too many rather than too few subordinate teachers; better results, the committee feels, would be obtained if the instruction were in the hands of a smaller group, more carefully selected with reference to their qualifications as teachers and not alone because of hospital affiliations. They should be reimbursed sufficiently to enable them to give the best of their thought and energy to the students.

The importance of organization should be emphasized. The division of surgery should be under the charge of a full professor—the executive head of the staff—selected because of his aptitude as a teacher, his interest in pedagogic affairs and research, his large clinical experience and general proficiency as a practical surgeon. It should be his duty to see that from the standpoint of the student the individual courses are effectively given; that there is not too great a divergence of views in the teachings of the various members of his staff. Not only should he have a keen personal interest in his own courses but those of his entire staff. He should have the power of nominating his subordinate staff and should be held responsible for the effectiveness of all the teaching in his division.

Selection and Promotion.—Qualifications for the major chairs should be (1) ability to teach, (2) proficiency as an operator, (3) a progressive spirit and inspiring personality,

(4) an appreciation of the value and importance of investigation and productiveness.

Promotion.—Promotion and rank should not depend upon length and seniority of service alone, but chiefly upon distinction and merit. A series of titles, such as the following, might be adopted so that it would be possible from time to time in recognition of certain definite attainments to advance the rank of the teacher.

1. Professor, Head of the Department.
2. Associate professor.
3. Clinical professor.
4. Assistant professor.
5. Associate.
6. Lecturer.
7. Instructor.
8. Associate instructor.

As to whether members of the staff should give their entire time to teaching we believe that while this is desirable for a limited number, instruction should not be entirely entrusted to these men. It is of the highest value that the student should come in contact with men of large clinical experience, i. e., men who have gained their knowledge through contact with a large amount of material both in hospital and private practice.

V. Methods of Instruction

The committee recognizes the futility of laying down hard and fast rules as to methods of instruction or as to the distribution of hours between the various methods. *Effectiveness in teaching is a matter of men and not of methods.* It should be borne in mind in planning a scheme for surgical instruction that the aim and object of the course is not to make specialists, but general practitioners. For this reason little attention need be paid to the details of operative technic in general as applied to the various operations. No attempt need be made to familiarize the students with operative procedures as such, but rather with the indications for and the results of those procedures so that as practitioners they may deal conscientiously and intelligently with those of their patients who present conditions which suggest the propriety of surgical intervention.

The greater portion of the allotted time should be devoted to the etiology, pathology, symptomatology, diagnosis and, with the above restrictions, to the treatment. The courses should be as far as possible graded and systematic, taking up first certain preliminary subjects, then the principles of surgery, and finally regional surgery. An attempt should be made so to correlate the didactic lecture and the clinic that the subject of the former may be fully illustrated by the latter.

METHODS OF INSTRUCTION

1. Didactic lectures.
2. Dry clinics.
3. Operative clinics.
4. Ward classes.
5. Ward work.
6. Case method.
7. General reviews and recitations.

FIRST YEAR

Dr. Matas suggests that a course of first aid to the injured be given to the first-year men, including litter and ambulance drill, elementary surgical technic, bandaging, making of splints, handling of the wounded, etc.

As there are no available hours in our schedule, this is entered as a voluntary course.

SECOND YEAR

In the last half of the second year certain preliminary courses may be given.

a. A course in bandaging, plaster-of-Paris dressings, appliances for fracture dressings, in "first aid" and emergencies .....30 hours

b. A course in surgical physiology, preferably in connection with the department of physiology (optional) .....20 hours

c. A course in surgical pathology. This may be given in the last half of the second year, partly in the last half of the second or first part of the third, or altogether in the third year.....60 hours

THIRD YEAR

1. *Surgical Pathology.*—Either in the second or third year .....60 hours

2. *Surgical Anatomy.*—Including especially the mechanics of fractures and dislocations, the regional anatomy of hernia, etc. .....30 hours

3. *Principles of Surgery.*—The following subjects to be included:

Trauma (contusions and wounds).
Inflammation.
Surgical fevers.
Surgical Infections (tuberculosis, tetanus, erysipelas, glandular, anthrax, syphilis, etc.
Diseases of vascular system.
Diseases of lymphatic system.
Diseases of osseous system.
Diseases of articulation, tendons and bursa.
Diseases of the nerves.
Diseases of the skin and cellular tissue.

To the prinieples of surgery are allotted 180 hours, as follows:

Lectures	60
Ward classes	30 or 60
Clinies	60 or 30
Recitation	30
Total	180 hours

According to this arrangement, for each week of the curriculum there will be two lectures, two clinies, and one ward class (or one clinic and two ward classes) and one recitation.

The hours for clinies and ward classes should be utilized as far as possibie to illustrate by ward or out-patients the subjects of the lectures.

4. *Minor Surgery and Technic.*—Each student should spend at least one month from 1½ to 2 hours daily in an active out-patient clinic under the direction of a competent instructor ..... 45 hours
In addition there may be introduced to advantage demonstrations to the whole class on some minor surgical procedures ..... 15 hours

Total ..... 60 hours

The subjects to be covered may include:

1. Anesthesia.
2. Antisepsis and asepsis.
3. Ligatures and sutures.
4. Hypodermic injections.
5. Use of saline solution, hypodermoclysis, intravenous and enteroclysis.
6. Paracentesis.
7. Local anesthesia.
8. Fixed dressings (plaster of Paris).
9. Irrigation.
10. Wet and dry dressings.
11. Drainage.
12. Artificial respiration.
13. Control of hemorrhage.
14. Counter irritants and use of cautery, etc.

FOURTH YEAR

1. *Regional Surgery.*—To include (a) the head, neck and spine, (b) the surgery of the respiratory system, and (c) the surgery of the digestive tract.

Didactic lectures	45
Recitations	15
Dry clinics	30
Ward classes	30
Ward work	30
Total	150 hours

The term "ward work" implies service in the surgical wards of the hospital. The student should be given an opportunity in this service to take the history of and to examine surgical cases, to familiarize himself with the preparatory treatment and after treatment of operative cases, to act as a dresser, and thereby become familiar with the technic of removing stitches and the principles of dressing the various kinds of wounds (aseptic, infected, etc.).

2. *Operative Surgery.*—One of the favorite pastimes of the student is attending operative clinics. The majority of the committee is convinced, however, that they are of little or no value, and if held, attendance should be entirely optional on the part of the student and no credit should be given for time thus spent. One of the committee believes that when preceded by a careful description of the case, in which particular attention is paid to the differential diagnosis, the operative clinic is not without value.

At all events the student should see a sufficiently large number of operations, carefully selected and well explained to enable him to have an intelligent appreciation first, of the assistance which the surgeon may render to the general practitioner; second, of the time at which surgical interference is

most beneficial; and third, of the risk incident to surgical interference. At least 30 hours may be set aside for attendance at operations in small sections (10 to 15).

In addition to this, however, a compulsory course in operative surgery on the cadaver should be given.

This course may include the following:

1. Ligatures of main arteries.
2. Suture of wounds.
3. Tracheotomy.
4. Circumcision.
5. Amputations.
6. Excisions.
7. Thoracotomy.
8. Repair of intestinal wounds and perforations.
9. Colostomy.
10. Gastroenterostomy.
11. Radical cure of hernia.
12. Nephrotomy.

Special attention should be paid to those operations which may be required in an emergency as life-saving procedures.

Animals may be utilized advantageously in demonstrating on live tissues such operative procedures as cannot in the nature of things be taught equally well upon the cadaver, such as ligation, repair of intestinal wounds and perforations; gastro- and entero-enterostomy. Animals so used should not be allowed to recover from ether.

Anesthesia.—As to the responsibility of the medical school to the student in the matter of instruction in anesthetics, there is no doubt in the minds of the committee but that each student should be given every opportunity to become familiar with the methods of administering the various anesthetics with their relative dangers, the treatment of emergencies which may develop during their administration and their after effects. At the same time the interest of the patients does not admit of the anesthetic being entrusted to the student alone. He should, however, be required before graduation to have assisted in the administration of the anesthetic under proper directions at least 5 and preferably 10 or more times.

Electives.—The committee does not wish to put itself on record either in favor of or against the elective system. Should there be any available time, it suggests that the younger members of the faculty under the direction of the chief of a department offer instruction in special subjects. Such instruction has two advantages. First, it enables the student to gain added knowledge in a desired branch, thus fulfilling the object of elective courses; and, second, it may point out for promotion men who may thus demonstrate special ability as teachers.

Orthopedic Surgery.—A committee appointed by the American Orthopedic Association, composed of Robert W. Lovett, M.D., chairman; Dr. H. Augustus Wilson and Dr. William E. Blodgett, makes the following requests:

That the instruction allotted to orthopedic surgery should be sixty hours a year.

That this instruction should be given in the third or fourth year of the course or in both.

That elective courses should be offered only where the above preliminary required course covers the rudiments of the specialty which should be known to the general practitioner.

5. *Genitourinary Surgery.*—

Lectures	15
Ward classes	15
Clinics	15
Total hours	45

SUMMARY

Second Year

Bandaging and fracture dressing	30	
Surgical physiology (optional)	..	
Surgical pathology	60	
Surgical anatomy	30	
Total		120 hours

Third Year

Principles of Surgery

Lectures	60	
Ward classes	30	
Clinics	60	
Recitations	30	
Total		180 hours

Minor Surgery

Out-patient clinics	45	
Demonstrations	15	
Total		60 hours

Fourth Year

Regional Surgery

Didactic	45	
Recitations	15	
Clinics	30	
Ward classes	30	
Ward work	30	
Total		150 hours

Operative Surgery

Cadaver	20	
Clinic	30	
Total		50 hours

Genito-Urinary Surgery

Lecture	15	
Ward class	15	
Clinics	15	
Total		45 hours

Orthopedic Surgery

Assignment of hours to be left to the discretion of the head of the department.

Total	45 hours
Grand total	650 hours

Respectfully submitted,

CHARLES H. FRAZIER, Chairman.

SECTION VII.—REPORT OF SUB-COMMITTEE ON OBSTETRICS AND GYNECOLOGY.

Query blanks were prepared and sent to all members of the committee and to the collaborators, replies being received from all. The query blanks were as follows:

QUERY BLANK

Fill in two separate blanks, one for obstetrics and one for gynecology.

1. What courses or subjects should be required as prerequisites to the study of the subject?
2. In what years should the courses be offered?
3. If offered in the third year should second year students in exceptional cases be allowed to take the work?
4. Should all courses be required? If not, what might be elective?
5. Give what you consider the best methods of instruction: didactic, clinical (amphitheatre) clinical (dispensary and hospital) practical or laboratory?
6. What proportions of the work should be given by the various methods mentioned in question 5?
7. What proportion of a 3600 hour curriculum should be devoted to the course or courses of the subject?
8. How many hours are devoted to this subject in your college? Lectures....; recitations....; laboratory....; amphitheatre and dispensary clinics....; hospital clinics....; total.....
9. Is the arrangement as given in question 8 satisfactory? If not, how would you modify it? Lectures....; recitations....; laboratory....; amphitheatre clinics....; dispensary clinics ....; hospital clinics; total.....
10. Should attendance on a certain number of labors be required for graduation and what would be a fair minimum requirement?
11. What laboratory equipment (apparatus) should be provided by the college?
12. What should be the minimum number of (a) dispensary and (b) hospital patients per student per year?
13. What would you recommend for the department in the way of (a) a library, (b) a museum, and (c) charts, stereopticons, etc.?

SPECIAL QUERY BLANK

1. Do you consider it advisable for obstetrics and gynecology to be taught in the same chair?
2. If so, what should be the limitations of each as far as pediatrics and general surgery are concerned?
3. If you believe each should have a separate chair, to which should belong the borderland subjects, such as extra uterine pregnancy, pelvic abscess, etc.?

The replies received were presented at a meeting of the committee held in Chicago December 16, 1908, at which Drs. Peterson, Guthrie, Schwarz, Clark and DeLee were present. After a free discussion definite conclusions were reached on all points, although unanimity was the exception rather than the rule.

I. OBSTETRICS.

In arriving at their final conclusions the committee kept in view the following points:—

1. *Qualifications of Medical Students.*—Medical students are of only average intelligence and education, not taught to think logically, and this statement applies with considerable though perhaps less force to the degree men. Few schools have really picked men, and a curriculum that would be ideal for such, would be absolutely misdirected in the majority of colleges. The degree of receptivity of the individual student varies. Some can grasp and retain knowledge easily while others require more thorough drilling. Many even require actual training in the things they are to do, just as we train nurses.

2. *Hospital Internships.*—The majority of medical students go into practice on leaving the college, only a small minority going into hospitals as internes. Even the latter

must have much preliminary practical training because in many hospitals the interne is thrown largely on his own responsibility. The medical college, in addition to ingraining the students with the principles of medicine, should also train them in actual practice. Nowhere is this as true as in obstetrics. Here most of all, the physician should have complete and natural command of methods. The practice of obstetrics is so different from that of surgery and medicine that the same general principles scarcely apply. On the other hand the accumulated experience of many centuries has developed a fine art of midwifery which should be possessed by every practitioner in order that the still frightful mortality and morbidity of childbearing women might be reduced.

3. *The Average Doctor's Practice.*—The cases treated by the average doctor are mainly in the departments of medicine, obstetrics, children, minor surgery and the specialties, in the order named.

Obstetrics is the most important branch of medical practice. Each confinement case represents two patients, which at once, arithmetically, proves the statement. Its practice requires unusual knowledge and skill, regardless of the fact that the vast majority of deliveries are conducted by unskilled midwives and others equally ignorant, and the race survives. The writer believes the contention will be granted, however, after some consideration of the facts. More than 6,000 women die, annually, in the United States during confinement. Countless numbers are made invalids for life or die ultimately from injuries received, or disease acquired while performing the function of reproduction. One half of the gynecologists' work is the repair of such women. Thousands of women live lives of barren unhappiness as the result of bad obstetric practice. No measure can be taken of the numbers of children damaged or paralyzed at birth, and doomed to a helpless, imbecile or nervously diseased existence. That birth injuries cause defectives is not a new theory. Thirty per cent of the blind are so because of the insufficient knowledge of the obstetrician. Obstetric complications are the most formidable which the practitioner has to meet. Eclampsia still has a maternal mortality of 20 to 40 per cent, and a fetal mortality of 50 per cent; placenta previa, maternal mortality 10 to 30 per cent and fetal mortality 40 to 60 per cent; rupture of the uterus, maternal mortality 40 to 80 per cent and fetal mortality 90 to 100 per cent—how few other complications show such frightful figures!

As a final argument,—a large part,—a major part of these deaths and of all this misery can be avoided, and will be when our practitioners become alive to the importance of this art and its possibilities in the line of preventive medicine.

The teacher of obstetrics has to touch upon all the other branches of medicine, indeed during the obstetric course nearly every medical subject comes under a more or less comprehensive review, e. g.

Anatomy.—The special description of the pelvis, pelvic floor, uterus and adnexa and the breasts.

Physiology.—The special consideration of the female generative functions, of the physiology of the child in utero and

of the mother during gestation, outside of the immense subject of the physiology of gestation itself.

Medicine and Pathology.—The complication of pregnancy with heart disease, tuberculosis, nephritis, and, the medical and pathologic sides of purely obstetric complications as eclampsia, hyperemesis gravidarum, puerperal psychoses, etc., etc.

Surgery.—The technique of asepsis and antisepsis, the special principles of the repair of wounds, the septicemias, etc.

Preventive Medicine.—The obstetrician is one of the vanguard in this line.

The obstetric course in a considerable degree is a review of all the other branches of medicine, and also of allied sciences, as mechanics and physics. These are required in the study of the mechanics of labor.

Sufficient has been said to show that obstetrics is deserving of a very important place in every college curriculum, and that the number of hours apportioned to it should be large enough to permit its being taught thoroughly.

4. *Obstetric Material.*—In many colleges it is still difficult to obtain sufficient obstetric material, clinical as well as pathologic. This must alter the teaching given in such schools as well as the time allotted to each kind of instruction. For example, major obstetric operations are quite rare and the instructor must show them to large classes, perhaps even to as many as 200. While the spectacular amphitheater clinic is generally considered useless and wasteful, here is an instance of necessity which may be turned to actual and lasting benefit. If the amphitheater clinic is ever useful, it is so in the obstetric department.

Further, obstetric cases in most cities are so inaccessible that the head of the department could not, if he would, perform all the operations before small classes, and yet the student wants and has a right to see his professor work. Obstetric preparations also are very difficult to get, and most schools have to depend on pictures and models.

With these ideas in mind the committee formulated the following answers to the questions placed at the head of this report.

A. Preliminary Subjects.

Anatomy, embryology, histology, physiology, physiologic chemistry, pathology, bacteriology, hygiene, pharmacology, toxicology, clinical chemistry and microscopy, all these, being the usual courses of the first two years, should have been completed by the student before beginning the study of obstetrics.

B. Place in the Curriculum.

Obstetrics should be offered in the third and fourth years of the curriculum, second year students not being allowed to take any of the courses. This rule is to apply also to second year students who have credit for some of the second year work and wish to take third year obstetrics, since they would then take fourth year obstetrics in the third year which is also undesirable. Some of the fourth year manikin or clinical

courses could with advantage be taken in the vacation between the third and fourth years.

All the courses offered by the department should be required. It was believed by the committee that since obstetrics was (*a*) so practical a branch, (*b*) so intimately associated with all the specialties, and (*c*) was practiced by so large a majority of graduates, that the time for elective courses in the subject had not yet arrived. Two members of the committee, however, advised that part of the course be made elective for those attracted toward laboratory work, or the specialties. One member of the committee recommended that second year students also be given some obstetric work.

C. Optional Courses.

The committee heartily recommended that, in addition to the required work, optional courses be given for special students or for those who intend to devote themselves more especially to obstetric practice. Such courses could be, (*a*) Special anatomy of the pelvis, including contracted pelves; (*b*) the histology and pathology of the endometrium, with reference to pregnancy, labor and the puerperium; (*c*) the toxemia of pregnancy; (*d*) special operative work on the manikin, and (*e*) student assistant work in hospital and dispensary.

D. Methods of Instruction.

The old didactic lecture is not favored. In its place may be given class demonstrations, conferences, recitations from standard text-books, or special notes issued by the chief of the department. The fullest use of teaching material such as charts, photographs, museum specimens, models, plaster casts, manikin, microscope and stereopticon will make these lecture-demonstrations interesting and profitable to large classes. This course should also include the exhibition and demonstration of clinical cases occurring in the wards. Operations which have been performed before small groups may be repeated on the manikin and the indications and technic discussed for the benefit of those who were not present. Pregnancy cases could be demonstrated by the chief to the whole class which would then obtain direct instruction in his methods from himself. It is not always possible for the chief to teach all the small groups of students in the wards, and yet it is essential that all the students see and hear the head of the department as much as possible. It conduces to uniformity of teaching, and gives the students higher ideals of the art.

These lecture-demonstrations, and clinic conferences,—in whatever form the instruction takes,—should be graded and given throughout the third and fourth years. If possible the class may be divided in sections, each under a competent instructor but getting the same instruction. Beginning with the physiology of the reproductive organs of the female, the clinical aspects of embryology, and the physiology of the ovum and of the new-born child could be given. Then might follow the physiology, diagnosis and hygiene of pregnancy, the clinical course, mechanics, and study of labor and the puerperium. This must include the pelvic anatomy as modi-

fied by parturition. Special attention should be paid to the conduct of labor, including asepsis, and technic. The latter part of the junior year could be devoted to the abnormal mechanisms of labor and operative obstetrics to prepare the student for the clinical work of the following summer and of the senior year. In the senior year the pathology of pregnancy, labor and the puerperium could be given seriatim.

To make the student thoroughly familiar with a few of the most important principles, fixing these in his mind by repetition, or by presenting them from different points of view, is considered a better method than an attempt to cover too large a field or to take up too many of the unimportant details.

E. Clinical and Laboratory Instruction.

Bedside instruction in obstetrics is best given in the fourth or senior year to very small groups of students, and should include the diagnosis of pregnancy, the care of the pregnant woman, the study of the woman in labor and the subsequent care of the mother and babe. This work should be done under college supervision in either the dispensary, the out-service, or in the hospital, and should be in addition to any time and instruction given to individual students at labor cases either in the hospital or in the out-maternity department. Laboratory teaching may be given in either the third or fourth years and should consist of the examination of placentæ, ova, blood and urine from pregnant women and eclamptics, of lochia, etc. This laboratory work should have direct bearing on the clinical study of the cases used for teaching under the care of the department. Other optional laboratory courses could be offered, more in the line of original investigation.

Amphitheater Clinics.—The spectacular amphitheater clinic is condemned, it should be replaced by class demonstrations in methods of diagnosis; in the determination of indications for treatment or operation; in the discussion of the kinds of operation and illustration of the principles of treatment, all aided by the use of charts, specimens, stereopticon, etc. Amphitheater clinics should never be used to teach details or for fine operations which should be done only before small classes.

Demonstration and Actual Training on the Obstetric Manikin.—In groups of not more than ten, under competent instructors, each student should have actual training on the manikin with human fetuses, and should perform the more common obstetric operations, as the use of forceps, breech extraction, and version, at least three times. The other operations also should be performed and discussed in these small groups.

F. Hours and Equipment.

The arrangement of the hours and the number of hours now assigned to obstetrics are not satisfactory. The committee decided that at least 120 hours should be devoted to lectures, conferences and recitations; 30 hours for *each student* in small groups be given to manikin work; and 30 hours be allowed for hospital or dispensary instruction to small groups of students; all this to be in addition to the time

spent at labor cases either in a hospital or out-maternity. Each student should have delivered at least 2 women *under* an instructor recognized by the College; and he should have witnessed 5 cases and these preferably in the senior year. This means that every senior student has attended 2 cases under college instruction so that for a class of 50 senior students 100 confinements per year would be necessary.

Every Department of Obstetrics should be equipped with 1. A museum containing normal and abnormal pelves, specimens of pregnant uteri, etc., etc. 2. A liberal supply of modern obstetric models, charts, and a stereopticon. 3. A working Obstetric Library. 4. A working Clinical Laboratory. The following might be a minimum requirement of above but it is suggested that this list indicates only the kind of material needed. The department will have to use what it can obtain best.

I. Equipment, Obstetric Department.

1. One Pinard or other good manikin for every 100 students.

2. One set of obstetric instruments for each manikin.

3. One normal pelvis and at least 6 pathologic pelves showing the common typical deformities.

4. Fetal skulls of different sizes.

5. Wet preparations. Ova at 5 different stages of development. Uteri at 3 different periods of pregnancy, and 1 after delivery. Specimens of the most common monsters.

6. Models of fetal heads showing moulding and models showing the mechanism of labor would be highly desirable.

7. Charts showing the different stages of labor, and mechanism, and the changes of pregnancy, labor and the puerperium, also the pathology of labor. 50 charts would hardly be enough for all these.

8. Microscopic preparations of the muscle of the uterus at different periods; of the changes in the endometrium, the breasts, etc., in health and disease. At least 30 of these, covering the different conditions.

9. Recommended are, a stereopticon, moulages and photographs of important conditions.

II. GYNECOLOGY.

The committee discussed the present status of gynecology and its relation to obstetrics and surgery, but no definite conclusions or recommendations could be made. Whether obstetrics and gynecology should be taught by the same chair is a matter to be decided by the individual medical school. Six members of the committee voted against and four members voted for the dissociation of the two branches. The proposal to make gynecology a department of surgery was not approved. No opinion was expressed as to the teaching of the borderland subjects of obstetrics and gynecology, such as extra-uterine pregnancy, pyosalpinx after abortion, rupture of the uterus, sterility, etc., though a general feeling prevailed that the obstetrician should extend somewhat his, at present, limited field of operative work.

Preliminary Subjects.—The subjects of the first two years of the medical course, the same as the required prerequisites for obstetrics, should have been completed by the student before beginning the study of gynecology. Gynecology should be given in the third and fourth years of the college curriculum and should not be open to second year students. All the courses herein outlined should be required, although other optional courses to special students or groups of students might be offered. Such optional courses might be, (*a*) special female pelvic anatomy, gross and microscopic; (*b*) pathology of the reproductive organs; (*c*) gynecologic operations on the cadaver; (*d*) special touch course and history taking, with the special study of cases in hospital or dispensary; e. g., student assistant work.

Hours of Instruction.—In deciding the amount and quality of instruction to be devoted to gynecology the committee felt as it did about obstetrics, only less strongly. It was agreed that if any reduction of the number of hours was necessary in the final division of time among the various departments, such reduction should be suffered by gynecology, and that the total number of hours for obstetrics be left at 180.

Of lectures and recitations the committee suggested sixty hours, to be given in the senior year. Thirty hours in the senior year should be given each student, in groups of two or three, for clinical teaching, touch courses, history writing, etc., and sixty hours be left for hospital clinics. Individual students could work up the cases used for these hospital clinics. This arrangement represented the maximum number of hours recommended by any member of the committee and it was understood that the subject of gynecology could be well presented with less. Several members believed this work could be largely elective and said that such a practice had proven very successful with their students. At the meeting of the chairmen of the ten sub-committees the number of hours to be allotted to gynecology was set at sixty, leaving 180 for obstetrics. Under these circumstances it might be best to divide the sixty hours equally between lectures and clinical work, leaving the rest of the course as above outlined to be elected by students who expect to specialize on the diseases of women.

Methods of Instruction.—(*a*) Lectures with demonstration of teaching material, such as charts, museum specimens, models, photographs with the aid of the stereopticon or the microscope. This course could well be supplemented by conferences, or by recitations from a standard text-book or from typewritten or printed notes issued by the chief of the department. The course should be given in the senior year, or in the latter half of the junior year. A thorough grounding in the principles of gynecologic pathology, diagnosis and treatment should be provided for rather than a too wide presentation of the subject with all its less important details.

(*b*) Clinical teaching, in Dispensary, Hospital and Laboratory. This should consist of touch courses given to classes of two to five senior students, in hospitals or dispensaries, and should include history writing, details of treatment, and the

laboratory examination of removed specimens, such as secretions, urine, blood, etc.

(*c*) Amphitheater Clinics. The spectacular operative amphitheater clinic is condemned. Classes in the methods of diagnosis, indications for treatment, or operation and in the study of presented clinical cases with a discussion of the principles of treatment, all aided by the use of charts, specimens, stereopticon, microscope, etc., are recommended as extremely valuable substitutes. Details of operations may be taught to sections of senior students in number not exceeding twenty.

Equipment.—As was indicated before, it is impossible to specify the parts of an adequate equipment of teaching material. Wet preparations illustrating the most common tumors, microscopic slides and drawings are almost always obtainable. Moulages and models of the important diseases and operations are now purchasable here and abroad. A gynecologic manikin and a stereopticon form valuable parts of the equipment.

The proper care of the specimens belonging to the two departments of obstetrics and gynecology is a very important matter. Such specimens, pelves, etc., are often irreplaceable and the hard usage they receive from students and the average college janitor, soon renders them valueless. The assistants of the department should give the museum their personal attention and assist the curator in the care and classification of the material.

Library.—Most of the best obstetric and gynecologic journals are usually found in the college library, and it is only necessary for the department to have its special case containing four or five of the *latest* text-books on obstetrics and gynecology, with some of the older epoch-making books, and complete files of two or three standard journals devoted to these subjects. If the college is located in a city without a large medical library, it is all the more needful that the department should supply greater reading facilities. It is a good plan for the instructors to assign subjects to the students for them to look up and report to the whole class, thus familiarizing the students with the methods of searching through the literature.

Qualifications of Instructors

A. Obstetrics.—It would be highly desirable if the chief of the department were to devote all his time to teaching after having worked up to the position through years of private and hospital practice. A purely hospital and laboratory man would not be able to give the students, about to be active practitioners, the training they will need in their work. The professor should recognize the urgent need that obstetrics be given a place on the same plane with surgery in the opinion of the medical profession and of the public. A spirit of investigation should pervade the department, and the chief ought to be a fountain of enthusiasm and inspiration for the study of advanced problems. The associates in the department should be men capable enough to replace the chief during his necessary absences, and should be able and willing to carry out plans and investigations along lines suggested by him.

The assistants should be young men or women with high ideals, and ambition to specialize in this branch of medicine, and a willingness to sacrifice their comfort and present advantage for future gain in knowledge and position.

Salaries should be paid all the members of the department, although probably few schools can now meet this recommendation. If the chief devotes all his time to teaching and hospital work sufficient income should be provided for him, either by salary, or from patients brought to the private wards of the hospital. The associates and assistants should receive remuneration for work actually done, which would enable the department to secure better assistants and also provide a check on their attendance to duty. Unfortunately most schools cannot pay their clinical teachers anything, and for that reason many good men are forced to spend most of their time in active practice. Uniformity of teaching, particularly in the practical subjects, and on the questions of indications for treatment, is of special importance. Principles laid down by the chief of the department should be taught by the associates and assistants who should amplify them where needed. This can be done without excessive dogmatism and with the preservation of a reasonable degree of freedom of opinion and of individual preference.

Electives form a part of the curriculum of several schools. The majority of the committee felt that at present it had best recommend a reasonable amount of required work, because practically all graduates should have that much knowledge of the subjects. Several members of the committee held decided objections to election in any department of medicine as now taught, believing that all elective work be reserved for an additional fifth year. It is evident that obstetrics touches all the specialties intimately, that it reviews the whole field of medicine, that few men specialize from the start; therefore, in a four year course, with few exceptions, all obstetric work should be required. Other optional courses could be given by the associates and assistants in summer, or even collaterally with the required courses, and would further serve to show the fitness of the instructor and his claims for promotion.

Promotion should depend on the teacher's ability to care for the higher position, not on political, nepotic, or clique influences. Long service in the department should be recognized if the applicant for promotion has been distinguished by loyalty and efficiency.

Gynecology.—What was said regarding obstetrics may well apply to gynecology. The case of obtaining clinical material, and the possibility of using day hours at set intervals for teaching, render hospital residence for the chief of the department unnecessary. For the same reason and because gynecologic work is less burdensome and requires less sacrifice of time, comfort and health, it is not so needful to pay salaries to the instructors in the clinical branches.

Electives find more appropriate place in gynecology and several schools now offer parts of the work as required and the rest optional. No student, however, should be graduated without thorough grounding in the principles of gynecology, and he should have had a touch course in gynecologic diagnosis.

Respectfully submitted, JOSEPH B. DELEE, Chairman.

SECTION VIII.—REPORT OF SUB-COMMITTEE ON DISEASES OF THE EYE, EAR, NOSE AND THROAT.

The report which follows has been prepared as the result of extensive correspondence and exchange of views, and represents in its main features the unanimous opinion of the committee. It is intended merely to be suggestive and to outline the methods which should be employed in giving to students during their medical course a satisfactory opportunity of becoming acquainted with the essentials of diseases of the eye, ear, nose and throat in so far as they belong to the equipment and education of a general practitioner of medicine. There is no intention to dictate in this matter, but only to advance such ideas as may prove of use to those who have charge of such courses as are herein described.

Following the request of a number of representatives of medical examining boards, as well as of the secretary of the Council on Medical Education, the matter in hand is recorded under the following headings:

I. The Time to Begin Instruction in Ophthalmology, Otology, Rhinology and Laryngology.—All members of the committee are satisfied that none of these branches should be taught in the first or the second year of the medical course. Whether the third or the fourth year of the course should be selected for the presentation of these subjects necessarily is best decided according to the arrangements of individual schools of medicine, because it is unimportant, in so far as the needs of the students are concerned, whether they shall be taught in the third or the fourth year, provided the courses supplied furnish those who participate in them the necessary instruction according to the plan which is later outlined. In a number of the schools of medicine the curriculum is so arranged that these branches are in correlation with certain laboratory courses, particularly as they pertain to anatomy and physiology, sometimes in the third and sometimes in the fourth year, and, as this is a wise provision, as will presently be shown, it would be disadvantageous to suggest the disturbance of a relationship which has proved to be satisfactory. At the end of the second year in the medical course a student has acquired sufficient knowledge to allow him to begin rhinology, ophthalmology and otology, and therefore there is no objection to his beginning the study of these branches in the third year, or to postponing it until the fourth year, or to pursuing it partly in the third and partly in the fourth year.

II. Preliminary Training.—The Committee is unanimous in its recommendation that students who come to the courses in ophthalmology, otology, rhinology and laryngology should be

grounded in the first or second years of their course in the anatomy, structural as well as regional, of the eye, ear, nose, nasopharynx and larynx. Thus the students should have full opportunity in the first or second year of their course to become acquainted (a) with the *structural anatomy* of the eye, ear, nose, nasopharynx and larynx, and (b) with the *regional anatomy* of these organs and structures, as follows: (1) The relation of the eye to the orbit and its surroundings, the accessory sinuses of the skull, the brain and the facial areas; (2) the relation of the accessory cavities of the skull to the nares, of the ear to the nasopharynx, of the lymphatic supply to the pharyngeal ring, and of the structures in the pharynx and larynx to the course of the blood vessels and nerves of the neck; (3) the relation of the ear to the nasopharynx, the brain, blood sinuses of the brain, vessels of the neck, etc. They should have a similar opportunity to become acquainted with the histology and embryology of the organs under consideration, as it is perfectly evident that without some practical knowledge along these lines they would find great difficulty in properly appreciating the diseases of the eye, ear, nose and throat.

The preliminary instruction in anatomy, histology and embryology should be given either by a series of lectures, demonstrations, dissections, etc., in the years which precede the study devoted to the specialties herein described, or else, and this would seem to be the better plan, in the association with the Department of Anatomy in each one of the schools, and it is recommended that such arrangement shall be made.

A similar plan should apply to physiology, and an arrangement should be made with the department of physiology in each medical school, as, indeed, such an arrangement now exists in a number of our schools, by which the students in the year preceding that in which they receive their training in these several branches should have the opportunity of obtaining the necessary physiologic instruction. For example, in preparation for the study of ophthalmology they should be taught physiologic optics, the theory and methods of the use of the ophthalmoscope and other instruments of precision, the technic of perimetry, color tests, etc.; in preparation for the study of otology they should receive instruction in the sound-transmitting apparatus of the middle ear, etc.; and in preparation for the study of laryngology they should be taught the use of the laryngoscope, the mechanism which controls the voice, the movements of the glottis and of the vocal cords, etc. It is desirable that such instruction should be given in properly equipped physiologic laboratories so arranged that the individual student may himself work with the necessary apparatus. The number of hours devoted to such instruction must necessarily be arranged after consultation between the heads of the departments concerned. In general terms, it would seem, taking the number of laboratory hours devoted to the eye in one course of this character in a physiological laboratory as an example, that 18 would be sufficient.

III. Necessary Qualifications of the Instructors.—Instructors in diseases of the eye, ear, nose and throat should be graduates in medicine. If possible, they should have received a general hospital training in medicine and surgery, and should have devoted themselves to the diseases under consideration for a sufficient period of time to enable them to qualify for the position of instructor with satisfaction to the head of the department. The head of each department should endeavor to encourage the activities of his instructors by giving them opportunities for original work, for the study and record of interesting cases, and in general terms, he should stimulate their respect for the material which comes to their hands. As the result of this the best type of specialist is gradually trained, and if each assistant is made to understand that good work will be recognized by preferment, and that preferment comes for no other reason, the efficiency of each staff will be increased and the whole department grow in strength. Moreover, nothing is so stimulating to students as to observe in their instructions real enthusiasm and a real scientific interest in their work.

IV. The Necessary Equipment for Instruction.—A well regulated dispensary is necessary, with rooms in which an adequate number of lights are placed for individual instruction, either rooms suitably partitioned, or else small rooms carrying a limited number of lights, thus facilitating a supervision of the students while at work. Each student in laryngology and rhinology should be provided with a head mirror, nasal speculum, tongue depressor, three laryngeal mirrors, and either a nasal or laryngeal applicator, or suitable forceps which can be utilized in place of applicators; in otology with a head mirror, aural specula and applicators; and in ophthalmology with an ophthalmoscope and a condensing lens.

It should be the aim of the instructors early to insist on the necessity of cleanliness, and therefore, for example in rhinologic work, each stall or small room should be provided, in addition to the means of illumination already described, with cuspidors, a tray for holding antiseptic solutions, and there should be within easy reach a sterilizing apparatus, so that each student's instruments may be sterilized before he begins the examination of his patient. The same care applies to the work in otology and in ophthalmology, especially in the treatment of the external diseases of the eye. Whether each student's equipment should be furnished by the college in which he is matriculated, or should be acquired either by rental or by purchase, must be decided by each individual school. In general terms, the committee is of the opinion that such equipment is best managed when it is acquired by the student, either by purchase or by rental.

Each dispensary should be furnished with a small laboratory plant in which the student may make, if necessary, examinations of sputa, nasal discharge, discharge from the conjunctival sac, etc., or if such an arrangement is not possible, opportunity should be given to the student for such examinations in the regular bacteriologic or pathologic laboratories connected with the individual medical school. Still another plan for carrying out this part of the instruction, and one

which works extremely well in several medical colleges, is that the necessary bacteriologic and microscopic examinations of the patients who present themselves for the examination of the students in the dispensaries devoted to the diseases of the eye, ear, nose and throat, shall be made by the students in their regular courses in clinical microscopy and bacteriology, and that reports of such examinations shall be handed to the instructor and filed with the record of case, where they may be compared with those which have been directed and acquired by the head of the department, or by that instructor or demonstrator who is in charge of this particular work. In this way each student soon becomes familiar with the urgent necessity of making these examinations as a routine matter in cases where the microscopic and bacteriologic content of secretions is necessary for a proper appreciation of the diagnosis and treatment.

V. Hospital and Dispensary Facilities.—Naturally, a medical school can not provide adequate instruction in diseases of the eye, ear, nose and throat unless it has at its disposal proper hospital and dispensary facilities. It is the opinion of the committee that it is not advisable to attempt to give figures in so far as the number of patients necessary for the proper instruction of the students is concerned, but the committee insists that each college which attempts to give instruction in the "head specialties" should be able by means of its dispensaries and hospital to furnish a sufficient number of patients to permit each member of each division of the class during the course of instruction to have the opportunity of seeing all of the common diseased conditions of the eye, ear, nose and throat which he is likely to encounter in the course of a general practice. This clinical instruction should not be carried on, or it should not be attempted to carry it on, to such a degree as would attempt the student at the end of his course to pose as a specialist in any of these branches. The whole object of the instruction is to teach *the essentials* of diseases of the eye, ear, nose and throat, that is, so much of these branches as it is necessary for each properly educated physician to possess. As an example of the practical instruction which may be given in laryngology, with the record of the diseases and conditions studied in section work, the following is quoted:

NOSE

- Rhinitis
  - Acute
    - Simple
    - Membranous
    - Vasomotor
  - Chronic
    - Hypertrophic
      - General
      - Inf. turbinal
        - Anterior
        - Inferior
        - Posterior
      - Mid. turbinal
        - Anterior
        - Inferior
        - Cystic
    - Atrophic
    - Polypoid
    - Tubercular
    - Syphilitic
  - Foreign bodies
  - Septum
    - Deviations
    - Spurs
    - Abscess
    - Perforations
    - Tuberculosis
    - Syphilis
  - Non-malignant growths
  - Malignant growths
  - Epistaxis (dilated vennles)

ACCESSORY SINUSES

Acute
- Maxillary
- Frontal
- Ethmoid
- Sphenoid

Chronic
- Maxillary
- Frontal
- Ethmoid
- Sphenoid

LARYNX

Laryngitis
- Acute
- Chronic
  - Hypertrophic
  - Atrophic
  - Tubercular
  - Syphilitic

Non-malignant growths
Malignant growths
Neuroses
Paralyses
Spasms

PHARYNX

Adenoids
Pharyngitis
- Acute
  - Simple
  - Diphtheritic
- Chronic
  - Hypertrophic
  - Atrophic
  - Syphilitic
  - Tubercular
  - Mycotic

Retropharyngeal abscess
Tonsillitis
- Acute
  - Simple
  - Diphtheritic
    - Peritonsillar abscess
- Chronic
  - Hypertrophic

Non-malignant growths
Malignant growths

TONGUE

Varix
Hypertrophied lymphoid tissue
Malignant growths

As an example of the practical instruction which may be given in otology, with the record of diseases and conditions studied in section work, the following is quoted:

Normal canal and drumhead.
Hearing tests.
Eczema of auricle and canal.
Furuncle.
Cerumen and epiderm impactions.
External malformations and lesions.
O. M. A. and paracentesis.
Acute suppuration.
Chronic suppuration.
Shrapnell perforation and attic suppuration.
Cholesteatoma and tympanic caries.
Acute mastoiditis and its non-operative cure.
Acute mastoiditis and its operative cure.
Chronic tympano-mastoiditis and its operative exenteration.
Meningitis, brain abscess and sinus thrombosis.
O. int., specific, traumatic and occupational.
Om. c. c., inflation and massage.
Catheter inflation and medication.
Artificial drumhead and drumhead patching.
Mechanical helps for impaired hearing.

As an example of the practical instruction which may be given in ophthalmology, with the record of diseases and conditions studied in section work, the following is quoted:

Functional testing—visual acuteness, power of accommodation, muscle balance, field of vision, tension.

The simpler tests to determine the presence of hyperopia, myopia and astigmatism.

Normal and abnormal pupil reflexes.

Ophthalmoscopy: Normal fundus, most common abnormal fundus conditions; for example, optic neuritis, optic nerve atrophy, albuminuric retinitis, chronic glaucoma, etc.

Epiphora and its causes: Acute and chronic dacryocystitis and lachrymo-nasal stricture, relation of the nose to these conditions

Blepharitis, styes and meibomian cysts.

Ectropion, entropion and trichiasis.

Various forms of acute conjunctivitis, notably ophthalmia neonatorum, gonorrheal ophthalmia, acute contagious conjunctivitis, Morax-Axenfeld conjunctivitis.

Trachoma and its sequels.

Phlyctenular keratitis.

Simple, purulent and infected corneal ulcers.

Interstitial keratitis and other common forms of non-ulcerated keratitis.

Chief varieties of iritis and iridocyclitis and their sequels, notably exclusion of the pupil and secondary glaucoma.

Cases illustrating the chief differences between the inflammations of the anterior segment of the eye, notably conjunctivitis, scleritis, iritis and acute glaucoma.

Injuries of the eye, especially those of the corneo-scleral junction and their sequels, notably sympathetic ophthalmia.

The main varieties of cataract, notably senile, congenital and traumatic.

Cases to illustrate the need of enucleation or one of its substitutes, the need of iridectomy or one of its substitutes, and the need of operations for cataract.

Cases to illustrate the difference between concomitant and paralytic squint.

Cases to illustrate the relation of ocular to general diseases.

These lists are recorded simply to show the amount of work which may be covered satisfactorily in the hours assigned to practical instruction in these branches, provided each department has at its disposal, as it should have, proper hospital and dispensary facilities. Naturally, each instructor will add to or eliminate from these lists as he deems wise within the time at his disposal, but in their main features they indicate the ground which should be covered in a properly conducted course on diseases of the eye, ear, nose and throat.

VI. The Number of Hours of Instruction.—These hours apply entirely to the instruction in course and do not include hours spent in preliminary work, training the student to receive his instruction in ophthalmology, otology, rhinology and laryngology, such, for example, as has been described as advisable in connection with the departments of anatomy and physiology. Neither do these hours in any sense apply to elective or to optional courses, but only to those which the student should have at his disposal in these various branches during his medical course.

If of the 140 hours which have been allotted to the "head specialties," 50 hours should be utilized in instruction in ophthalmology, 50 hours in rhinology and laryngology, and 40 hours in otology, it is the opinion of the committee that 20 hours should be devoted to theoretical instruction in each one of these branches, that is to say, to an instruction which includes lectures, didactic or clinical, recitations and demonstrations, and that 20 hours should be devoted to sectional teaching, in which sections of suitable size, such as have already been described, should be taken into the dispensary or hospital ward, as the case may be, and given the opportunity, under proper supervision of instructors with the necessary qualifications, to make the needed examinations with suitable instruments of precision, and actually see the diseased conditions which are presented. The smaller these sections are the better, and, if possible, in the manipulation of the instruments of precision, each five or six men should be supplied with a qualified instructor.

With this arrangement the departments of laryngology and rhinology and of ophthalmology would still have 10 hours at their disposal, and it is the opinion of the committee that these hours should be devoted either to theoretical instruction, section teaching, recitations, quizzes, etc., as the head of the department may deem wise.

In order, however, to show how this apportionment of hours appeals to individual members of the committee, cer-

tain special recommendations may be quoted in which it is shown that not only could the proper instruction be given during the time which has been assigned, but even in a fewer number of hours. Thus, Dr. C. G. Coakley writes: "If I were compelled to utilize 50 hours of instruction for laryngology and rhinology, I would divide it so there should be 20 hours of theoretical instruction and 30 hours of practical instruction. In the 20 hours of theoretical instruction there would be one recitation hour during the two semesters. The practical instruction would consist of one hour daily instruction for five weeks, namely, one-half of one semester." He feels, however, that 50 hours devoted to laryngology and rhinology is really more than is necessary, and that equally good work could be accomplished in 40 hours. Thus, the head of the department could arrange the instruction in theoretical work so as to utilize the time to the fullest extent and adequately cover the ground in 20 recitation lectures, which would leave him 20 hours for practical instruction, according to the manner already described, five hours a week for four weeks. This time he believes to be sufficient in which to instruct the average student in the practical manipulation of the instruments.

Referring to otology, Dr. Randall points out that with 40 hours assigned, 16 hours should be devoted in didactic lectures to the portrayal of diseases of the ear, 4 hours to its surgical pathology, and not less than 20 hours to practical work in the study and treatment of patients.

Referring to ophthalmology, Dr. Myles Standish writes: "The amount of ophthalmology which should be taught to a class of medical students who intend to fit themselves for practice in general medicine can be compressed into 20 lectures and 14 clinical exercises, if the latter are given to small sections at a public clinic under competent clinical instructors."

He also points out, and the committee desires to call attention to this especially, that the word "hour" is too frequently used indefinitely. Thus, ordinarily a didactic hour, if it may be so described, means a period of sixty minutes, while a clinical or laboratory hour frequently must mean a longer period of time, and in the schedule just quoted the 14 clinical exercises actually consume 28 hours. The opinion of the committee is strong that medical schools in their descriptions of the courses given in these various branches should be explicit. Thus, when in the catalogue of any medical college it is stated that so "many hours" are devoted to clinical instruction, clinical instruction should be defined as to whether it means "so many hours" devoted to section teaching with opportunities of personal examination of the patients, or whether an hour of clinical instruction means a lecture given to an entire class in a large clinical room. In the absence of such explicit description it is impossible to be certain how much individual instruction the student receives. Moreover, in the descriptions, for example, of clinical exercises, clinical lectures, etc., there should be a definite statement as to the exact length of time which such an exercise or clinic consumes.

Of the 140 hours allotted to the head specialties, two members of the committee, namely, Dr. Frank C. Todd and Dr.

W. H. Wilder, suggest the following division: Seventy hours for ophthalmology, 40 hours for rhinology and laryngology, and 30 hours for otology; or, if 50 hours should be conceded to rhinology and laryngology, ophthalmology should have 60 hours and otology 30 hours.

In conclusion, the committee desires to make reference briefly to one or two additional matters, namely:

1. The descriptions thus far given apply only to the amount of work which should be required of the individual medical student in so far as his instruction in the "head specialties" as part of his preparation for a practice in general medicine is concerned. It is again pointed out that no effort has been made to describe the technic of optional or elective courses, but it is evident that if the student should be stimulated to specialize in any one or all of these branches, he should have the opportunity of continuing his study in such optional or elective courses, or in postgraduate work.

2. It is the opinion of the committee that the amount of time recommended for so-called didactic or theoretical instruction is necessary, because by it, to quote one correspondent, the student's knowledge is systematized, and moreover, opportunity is given to bring these courses in special medicine and surgery in proper relation with the other branches of medical teaching, so that the student shall understand that while he is studying a special branch of medicine and surgery, he is studying it in order that it may help him to appreciate its importance in relation to other regions of the body, as well as the importance of other regions of the body to it. In other words, the fullest opportunity should be given to the student to realize what is meant by the terms medical ophthalmology, medical otology and medical laryngology and rhinology, so that when he later examines patients in the dispensaries he can grasp satisfactorily the importance of the relation of the disease of the special organs to the general economy.

3. Operations performed in the presence of large classes, as, for example, in an operating amphitheater, about which numbers of students are ranged on benches, are valueless in so far as the instruction of these students is concerned. Should the operations in each one of these departments become part of the practical instruction, and in so far as the most important of them are concerned they should form part of such instruction, they should be so arranged that they can be performed in the presence of small sections of men so placed about the operating table that each student may have an opportunity of witnessing the operative technic.

While students should be taught the necessary manipulations of the instruments of precision and should make the ordinary applications required in the treatment of the diseases of which the patients are the subjects, they should not be allowed to perform operations on dispensary patients, and if operative work is to form part of the course, the student should be taught operative technic, for example, in the ophthalmic course, on animals' eyes fastened in suitable masks, or in the other branches on the cadaver. This recommendation relates to instruction in course, not to instruction in optional or elective courses or in postgraduate work.

4. A question of some importance is to determine how much practical instruction the student should receive in determining the anomalies of refraction of the eye. As has already been pointed out, a suitable arrangement with a physiologic laboratory gives the opportunity to the student to learn all of the theory of refraction that he needs to know, and if the course herein outlined is followed, he should acquire sufficient knowledge to enable him to determine the presence of the ordinary anomalies of refraction—hyperopia, myopia and astigmatism—and the relation which such anomalies have to the symptoms which his patient presents. To quote from one of the correspondents, "a knowledge of refraction to be of any service necessitates much time and study and is unnecessary for the general practitioner." What is necessary, however, is that this general practitioner should understand the relationship of such anomalies to the health of his patients, and should be able to point out to them how they can be relieved of the difficulties which these refractive defects bring into existence. In other words, it does not seem to the committee that it is the duty of medical teachers to give medical students in course who are fitting themselves for a general practice, an amount of instruction sufficient to enable them to have "a working knowledge" of refraction, but only that amount which they require to detect the presence of the anomalies of refraction and their influence. This, at least, is true in so far as our present courses of medical instruction are arranged.

Should in the future a fifth year be added to the general course of medical instruction, during which any student could elect to increase his work and efficiency in any one branch of medicine, time would be at hand in which to allow the student to graduate with this working knowledge of refraction. At present, however, he necessarily must acquire this knowledge and practice, not during a regular course, but during an elective or optional course, or by postgraduate work, exactly as he acquires similar proficiency in any one of the other special branches of medicine and surgery.

5. Thus far the report has made no reference to the instruction in pathology and pathologic anatomy of the organs and tissues concerned in the head specialties. In the number of hours allotted a sufficient time must be given to this particular subject to enable the student to obtain a satisfactory understanding of his clinical work, and each teacher will naturally include instruction in pathology in his course. An admirable plan, however, which works well in certain medical schools, is an arrangement with the department of pathology, exactly like the one with the departments of physiology and anatomy which has been described, by which the student may acquire such knowledge of the special pathology of the regions now in discussion as may be necessary.

Respectfully submitted,

GEORGE E. DE SCHWEINITZ, Chairman.

SECTION IX.—REPORT OF SUB-COMMITTEE ON DERMATOLOGY AND SYPHILIS

The committee on the teaching of dermatology and syphilis met on the evening of Friday, Sept. 25, 1908, at the Hotel Belvidere in Baltimore. Since that meeting the members of this committee have been in correspondence and this report, which is a slight elaboration of the report made to the meeting in New York, is the result of an expression of opinion of nine of the ten members of the committe.

The committee reports as follows:

(a) Diseases of the skin and syphilis should constitute this department; and gonorrhea, and its sequelæ and accompaniments in the genitourinary tract, should be included under genitourinary surgery.

(b) This course should preferably be placed in the senior year, but where necessary may be placed in the junior year. The feeling of the committee for placing the subject in the senior year is very strong and it believes that the course should be placed in the junior year only when the exigencies of the schedule make it practically impossible to place it in the senior year. A majority of the committee are of the opinion that, better than placing the entire course in the junior year, would be to give the didactic instruction in the junior year and the practical in the senior.

(c) This department should have the student after he has finished the fundamental subjects and preferably after he has had a course in internal medicine.

(d) At the head there should be a man who is an authority or a qualified expert. For his associates and assistants he should have men, preferably, who intend to make themselves expert in this department, or at least those who have had a reasonable amount of experience.

(e) As the first condition of satisfactory teaching in this department there should be clinical instruction in small classes. In addition there should be a general clinic associated with the necessary didactic or systematic teaching. There is a very strong opinion in the committee in favor of small clinical classes and the committee believes that most of the practical instruction should be given to the students in small groups. At the same time it is realized that dermatological cases can be demonstrated more easily before a number of students than most other cases, and that the general clinic when properly conducted may be made satisfactory.

(f) The necessary equipment includes colored illustrations, projection apparatus, microscopes and the usual laboratory facilities.

(g) There should be enough patients to illustrate repeatedly the commoner dermatoses.

(h) Approximately two-thirds or three-fourths of the time assigned to this course should be given to practical instruction and the remaining one-third or one-fourth to didactic. The committee believes that one fourth time for didactic instruction and three-fourths for clinical is a better ratio than one-third for didactic and two-thirds for clinical, but where the arrangement of schedules makes the division in one-fourth

and three-fourths respectively impractical, it believes that the ratio of one-third for didactic and two-thirds for clinical teaching may be approved.

(i) The number of hours assigned to this course should be 90.

(j) The scope covered by this group of subjects is definite and offers little opportunity for repetition by other departments. The following statement seems all that is necessary to avoid difficulty on this point: The anatomy and physiology of the skin, excepting perhaps a brief review, should be left to their respective general departments. The histopathology of diseases of the skin is so scantily considered in the other courses in pathology and is of so much importance in dermatology that it should be given full consideration in this department.

In this department there should be given a systematic course on syphilis as a whole and a detailed consideration of its cutaneous manifestations. Detailed consideration of syphilis of the viscera and of other tissues than the skin does not belong to this department, but should be left to those departments where these subdivisions of the subject naturally fall.

Chancroid should be considered one of the infectious diseases of the skin and taken up by this department. The cutaneous manifestations of the exanthemata should be covered by this department, but their general consideration should be left to medicine.

Respectfully submitted,

William Allen Pusey, Chairman.

SECTION X.—REPORT OF THE SUB-COMMITTEE ON HYGIENE, MEDICAL JURISPRUDENCE AND MEDICAL ECONOMICS

The medical profession is beginning to realize that "minding one's own business" may be overdone and that the glory of having reduced "aloofness" to a fine art does not compensate for the resulting loss of power for good.

The American Medical Association has been striving for years to create a spirit of cooperation in the profession itself through its Committee on Organization, the Council on Medical Education, and other arms of its service.

Your ten sub-committees on medical curriculum seek to effect further coordination and to raise the standard of the physicians of the future.

Your Sub-committee on Hygiene, Medical Jurisprudence and Medical Economics, assumes that its peculiar function is to convince practitioners, teachers and students of medicine of their personal and collective responsibility for cooperation with forces which should articulate with medicine.

In a number of important lines, modern economic and social development offers logical leadership to medicine, but unless the opportunity is fully appreciated and due preparation made therefor, medicine will be forced to cooperation under

other and less natural directorship. The high place of medicine in the world's work is now generally recognized, and we should anticipate a constructive period where medicine combines its former willing service to the sick with a new function of private and public teaching in the prevention of sickness.

In order to meet this demand, team work must be done in medical societies to bring the need home to the practicing physician and to prepare him for this work. In addition, team work must be done in medical colleges where the student has not lacked for detailed instruction in normal and perverted function, metabolism, diagnosis and cure, but has failed to receive such teaching as would coordinate and apply practically, his knowledge to the practice of right or hygienic living ("orthobiosis") and to prepare him to teach his patients the art of avoiding diseases.

In addition to this, the present and future practitioners of medicine must be provided with the proper "receptors" whereby they may articulate with other forces which must be recognized. When recognized, they must be employed as co-educators with the medical profession. Our medical schools and medical societies must use engineers, lawyers, social workers, economists and others as teachers and in society programs.

Failure to recognize this need, combined with over-teaching as to professional silence, has unwittingly made the doctor help in the development of many forms of quackery included in systems of so-called physical culture, osteopathy, cheiropractics, Christian Science, faith cure, water, food and clothing fads and cures, etc., each of which is an expression of desire on the part of the people for more knowledge about themselves, than which they fail to find a more interesting or vital topic.

The double function of cure and prevention is double also in its application. Its application to patient and family is quite different from its application to the masses. This latter involves intelligent cooperation with still other forces.

The rapid progress of medicine by the application of physics, chemistry, biology and other sciences to her own recognized needs, is guarantee enough that she will be amply able to assume the new functions of applying medical knowledge to other fields, if she can see the demand and will make systematic study of economic, social and political needs and methods.

Cooperation is the watchword of the day and the public is clamoring for medical leadership and attempting by every possible means to stimulate medical cooperation. The public feels its ignorance and recognizes that it has been at fault. In attempting to secure medical assistance, it has not discriminated as to its sources of information; has not provided funds and machinery for education in matters of health; has not kept its health affairs out of politics; has not provided funds for public health machinery and can not therefore expect men to train themselves thoroughly for temporary posts, which do not provide in themselves a livelihood and the work of which is so different from ordinary medical work as to jeopardize the medical future of the man who undertakes it.

The average individual seems willing to pay for a cure. Communities are likewise willing to pay for a cure and to employ engineering, public health and other experts under the stimulus of some recent bitter experience.

Clinical experts, consulting and commercial engineers thrive because they can help the individual or community out of difficulties. Sanitarians, municipal engineers and others whose chief function is prevention are usually left to semi-starvation, because it is human nature to risk the necessity of having to spend lives and money in order to get out of a difficulty rather than to spend a small fraction of the amount in avoiding the situation.

Medicine has developed a great number of specialties but has not, however, as yet admitted to the public that one physician is not quite as good as another when it comes to public relationships, such as court procedure, public health and the education of the public in matters medical. The result is that the "medical expert" is not taken seriously. The public is full of misinformation concerning vital medical matters and public health officials are apt to be either inefficient on account of training, or capacity. The total responsibility of public health work has been too long thrust on reluctant medical men who are sometimes weak enough to assume it without adequate authority, or the possession of special knowledge, or of proper technical and legal mechanism, or of proper financial support for meeting the responsibility.

The objects to be accomplished by your subcommittee may be briefly summarized as follows:

"To point out the present and future need of men with medical training who shall specialize in various directions not hitherto recognized as essential and to suggest means of providing that training.

In order to bring these matters before the Council on Medical Education and teachers in medical schools, so that due provision may be made in the curricula of our medical colleges, and in order that the present generation of practicing physicians may realize their responsibilities and see the available opportunities of informing themselves, their patients and families and the general public, of the fields in which medicine can be more useful, it would seem wise to go somewhat into detail

Relation of Medicine to Engineering

Engineering and technical schools are making special features of courses in sanitation and creating fields in which the doctor of individualistic tendencies is easily lost. Their natural subdivision of health problems is into the "medical and sanitary."

In order to give the viewpoint of the sanitary engineer, quotations may be made from letters written to the subcommittee by leading members of the profession. The following is from Mr. Robert Spurr Weston of Boston:

"It is generally assumed that a physician by his training and on account of his experience in practice, is fitted to meet emergencies of public health service. Yet at present the physician is trained to consider mankind in the individual, and it is only by a change in this habit of thought, acquired in the practice of medicine, that he learns to consider mankind in the mass. . . .

"Notwithstanding the difference in training of the physician and the sanitary engineer, which is largely in favor of the sanitary engineer, the public reasons that whereas physicians have to do with sickness, therefore they are more competent to deal with problems of public health than any other class of professional men. . . .

"It is the common belief of those best informed on public health matters that the work in America will follow two lines, namely, medical and sanitary; that the training of the physician fits him better to undertake the former and the training of the engineer makes him better fitted to undertake the latter work, provided both have enough further training to enable them to consider the problems from a social rather than an individual standpoint. . . .

"From my standpoint, it would seem that the average medical graduate is wofully deficient in the principles of even ordinary personal hygiene; in fact, the subject is better taught in many universities than in some medical schools. The subject is not popular with the students and the laboratory method is seldom used as an aid to teaching. I find that the results of laboratory investigations of personal hygenic problems, like those made in Germany, are seldom demonstrated in class here. . . .

"In a few words, the situation is this: Public health work can best be carried on by one trained especially for it. The average medical graduate is ignorant of statistics and the methods of public sanitation. The ordinary sanitary engineer has no knowledge of disease and no doctor's degree. The problem is to fill the deficiencies in the training of the medical graduate or of the graduate in sanitary engineering or applied science in order that he may be competent in his early years to accept minor positions and in his later years grow into the more important ones, specializing as he grows older, along the lines of his early professional training, medical or engineering."

In speaking of graduates of a noted technical school, he says:

"These men lack, however, what I may term the 'disease point of view' and I fully believe that the education and recognition of the profession of health officer or sanitary expert by instituting courses for their training, would be a great advantage to our country, and would do away with much of the continual wrangling such as goes on in Germany between narrow minded constructing engineers, without knowledge of public hygiene, and hygienists deficient in the knowledge of sanitary engineering, yet provided with the power of initiating public sanitary works and in so far as their daring warrants, of dictating plans therefor."

Mr. George C. Whipple of New York says:

"I am inclined to think that the medical schools, like the engineering schools, are overspecialized and I do not believe in giving too many courses that are outside of the group of fundamental studies. It seems to me that we must make a differentiation between the education of the practicing physician and the education of the health officer, and while these two lines of instruction might be carried on in the same institution, I do not believe that they ought to be carried on in the same courses. Doctors as a rule do not make good health officers for the reason that the average physician has no quantitative sense. . . .

"I do not see why it would not be a good plan for a medical college to have a course leading to the degree of doctor of health or something like that. I think it would be a popular course and in time become a most valuable one. . . . The very existence of such a course, distinct from that of medicine, would have an important moral effect upon the medical fraternity and would fill the gap that now exists between the two professions of the engineer and the doctor."

It is quite apparent that the engineer sees two distinct fields in public health. But it is also quite apparent that the doctor who intends to be a professional sanitarian should

have a thorough understanding of all the problems involved, so that he can interpret engineering investigations of sanitary problems and discriminate between engineering recommendations as to their practical applicability to the sanitary end in view.

Still further, it is necessary that every physician in a community should know something of the principles of sanitary engineering in order that he may help to mould and guide public sentiment through the action of medical societies, public meetings and his personal teaching to his patients and their families and to get on and remain on the right side of questions of public sanitation.

It is also obvious that in medical colleges or universities in which there is a medical department, some teaching in medicine and its allied sciences should be given to engineers, who propose to specialize in municipal and sanitary work, so that they may be provided with a sufficient amount of "medical sense," or the "disease point of view" to enable them to work shoulder to shoulder with the medical health officer and the clinician.

The Relation of Medicine to Organized Charity, Social and Other Work

The development of charity and social work has led to a number of schools of philanthropy, etc., and, in the larger cities, to local organizations, which have done much to stimulate medical men to a knowledge of their own limitations. It is frequently stated that many of those workers are much more efficient in the educational, statistical and even practical phases of tuberculosis and other public health movements than many of the doctors. This is doubtless true, but must not be allowed to continue.

Church movements, co-ordinated with settlement work and the medical care of patients are beginning to recive a good deal of attention. If medical men, imbued with the proper spirit of cooperation and who are, temperamentally and by sound training and high principle, properly fitted for the work, will assume and maintain leadership, much good will result.

In addition to the relief of conditions found, the work of instruction so as to avoid for the future, real as well as imaginary ills, constitutes a work which is well worth while. It begets, however, a new relationship and requires study for the graduate physician as well as instruction in the medical school concerning social problems. This has not yet been provided for either in the work of most medical societies or in medical schools. It is plain that this class of workers also recognizes the part to be played by medicine in their own field.

The Relation of Medicine to Law

The failure of each to understand the other's field has led to mutual distrust. As Dr. McCormack has pointed out so frequently, there is the greatest cooperation between members of the legal profession, except at particular times when they are opposed in any given case. The succeeding sessions of court, however, through frequent rearrangement stimulate fraternal relations. The necessity of studious preparation

for each case and the resulting "battle of the wits" makes of the court-house a school for graduate instruction.

The isolation of the doctor does not tend to fraternalism nor do the exigencies of routine practice lead naturally to graduate study. The lawyers themselves admit that there is a growing tendency on the part of the best members of their profession to engage in the work of advising commercial interests in the line of preventing lawsuits rather than to encourage court proceedings. Preventive law is growing, perhaps, even faster than preventive medicine. Lawyers, however, recognize a medical field in their own work, although the "medical expert" usually receives scant respect. There has been an absolute lack of cooperation between these two professions in discriminating as to the qualifications of different medical men to give expert testimony and to establish the function of the medical expert as adviser to the court in the interpretation of evidence which involves medical matters.

The initiative must be taken by the medical profession. This involves the recognition and admission by the profession of the necessity for special training and special qualifications in the various lines of medical expert work. The profession itself by some adequate methods should select as advisors to the court different groups of men who are competent. This means that the doctors should be the first to admit that medicine consists of a great many fields of work and that all physicians are not equally qualified for each field. Fitness and not fee must be the main consideration.

The legal and medical professions must work together in the securing of proper legislation which relates to private and public health and well being.

Medical societies should afford opportunities for frequent meetings with their legal brethren to consider subjects of mutual interest.

In order to do away with the weakness which exists today medical jurisprudence should be taught probably by a group of medical men, each skilled in some particular phase of the work and by members of the legal profession qualified by special experience to teach the medical student his future legal responsibilities, his limitations and proper conduct in court procedure.

Here again is a field in which the necessity for medicine to lead movements in certain directions is already well recognized. We alone understand the medical aspects of the work, although as a rule we understand nothing of legal procedure. The legal profession is ready to help us if there is unanimity in the presentation of our medical problems.

The Relation of Medicine to Education and to "School Hygiene"

There seems a great tendency on the part of the educationalist to assume that school hygiene and in general the sanitary problems of education are so different from other phases of public health as to require special machinery and very special training.

The "medical viewpoint" should be given to the professional educationalist and the medical man should add to his med-

ical knowledge, some practical working experience in the daily problems which confront the educator.

The question of leadership is perhaps not a vital one, but it is vital that medical societies should provide in their own programs opportunity for a free discussion before the public of school hygiene by educationalists, medical men, and professional sanitarians. It is yet more vital that medical students should be apprised of their future responsibilities as private and public teachers of the personal hygiene of school life.

The need of proper teaching in our schools in matters of personal and public hygiene has been realized for many years and although positive harm may have been done by the kind of instruction hitherto provided, much can be accomplished in the future. Books, pamphlets, sheets and proper illustrative material must be provided for the teacher. These must be prepared by medical men and sanitarians of wide experience and practical knowledge of the fields to be covered in cooperation with educationalists. The language must be simple and suited to the receptivity and stage of development of the particular set of pupils for whom the instruction is intended. Such instruction must be extended, amplified and generally adapted to high schools, colleges and universities. More advanced information must be provided for the teachers themselves and health departments and members of medical societies must participate in the teaching of summer and normal schools and colleges of pedagogy, or education.

It is necessary too, that the work of medical inspection, teaching of personal and public hygiene and other phases of school hygiene, be properly articulated and harmonized with physical culture and gymnastic and athletic work, and that this latter be given proper medical supervision.

The educationalist recognizes the need of expert medical and sanitary guidance and is quite willing to cooperate but like the lawyer often lacks discretion in his selection of collaborators, or finds that desirable medical men will not interest themselves in his problems.

The Relation of Medicine to Economics

Little need be said concerning this matter since so much publicity has been given to the work of the American Health League and the Committee of One Hundred, appointed by the Section in Social and Economic Science of the American Association for the Advancement of Science.

The various phases involved in the prevention of disease are thoroughly considered and presented by a member of your sub-committee (Professor Irving Fisher, of Yale University), in the forthcoming report of the National Commission on Conservation of Natural Resources. The title of the report is "Conservation of Human Vitality."

It is significant that since the economists have been led to study loss due to disease a great public interest has been aroused. This is largely due to the use of channels and methods of publicity which hitherto the medical man has not employed.

Professor Fisher, in our sub-committee work says:

"I think emphasis on the necessity of publicity should be put before the profession. I think the profession instead of being a lot of individual clams in their shells, should really be public officers, first and foremost in protecting the public from her infinitesimal foes, as policemen protect from burglars or an army protects from invaders. Moreover, this is the best way for the profession to avoid quackery. While the individual practitioner is afraid of 'queering' himself with his medical brethren, the advertising quack is getting the public ear. Medical men thus voluntarily surrender to their enemies a most effective weapon. As soon as the medical men are willing to tell the truth in public, they will find it easier to prevent the quack from telling lies in public. . . .

"While the technical doctor is declaiming against the quack in the paper which he reads and prints in an edition of a few thousands, the quack is presenting his lies through newspapers to as many millions. It should be no more wrong, or considered wrong, for physicians to instruct the public through the daily press by signed articles, than for the lawyer, scientific or business man, or public officer to do so. . . .

"I want some day to write an article on the lameness of medical ethics from the standpoint of economic efficiency."

Not all physicians are at present prepared to act as educators of the public. Fisher, Norton, Devine, and that large group of social, charity and economic workers who have had to study the economic phases of disease, make progress much easier. The magazines, newspapers, and various publications are doing much in the general campaign concerning the elimination of preventable loss, although the lack of fine discrimination between medical men, methods, theories, facts and relationships is often apparent. The recent publication by Dittman, in the supplement of the Columbia University Quarterly, for June, 1908, is of especial value.

When the economist and physician both come to a clear and thorough understanding, each of the other's field, the team will be able to do double work and the results will come rapidly because statesmen and politicians will be able to grasp the magnitude of the asset which is constituted by public health, if it can be stated in terms with which they are familiar. Life insurance companies are already contemplating plans for a campaign of public education regarding disease, and its prevention as a business proposition.

Probable Lines of Development in the Teaching of Hygiene

With the present trend toward great publicity, it is inevitable that the medical profession will be called more and more into cooperative prominence, and must be acclimated to the midday glare of publicity. It is imperative that they should prepare for this change in function and relationship, first, by correlating what is already available in the medical field and second, by seeking to coordinate their efforts with the other available public and private forces. Engineering colleges have already introduced sanitary courses. Universities with economic and statistical, educational, engineering and legal departments will doubtless institute courses of instruction. Universities which are provided with medical colleges or schools should develop, at once, real departments of hygiene.

A department of hygiene might well be one of the constituent departments of a medical college or school, and its primary function should be that of instructing undergraduate medical students. As the next stage of development, graduate courses for medical health officers might be established and,

still later, graduate courses for municipal engineers, social workers, statisticians, economists and those who deal with the legal phases of public health and medicine might be added.

It may be that the work would rapidly assume university functions and grow beyond the sheltering wing of a medical college. This would be a simple matter of adjustment in universities where colleges or schools of public health could be created if necessary, although the public health teaching work of medical colleges which are not affiliated with universities would probably be limited to public health instruction of the undergraduate medical students, and cover only such teaching as should be given to every practitioner.

Teachers in Public Health

It is probable that, under ordinary circumstances, a medical man trained by years of service in actual sanitary work should be at the head of the department. He should consult frequently with the various medical, scientific, and laboratory teachers so as to see that a proper foundation of technical facts and methods is laid. It should be his function to see that all teaching done by himself and others is properly coordinated, assimilated and applied.

In public health basic teaching is already provided in a number of laboratory and clinical departments but it will be the duty of the department of public health to classify, arrange and coordinate this teaching in its application to the needs of the physician in his work of teaching personal hygiene to his patients and their families, and of articulating with municipal, state and federal public health authorities and public health movements in general.

The department of public health should provide instruction by technicians in medicine, dentistry, engineering, sociology, economics, law, education, and possibly also veterinary medicine. Professional sanitarians engaged in actual health department work of municipalities, counties, states or government, and officers of public institutions such as contagious disease hospitals, schools, and homes for the blind, deaf, dumb, feeble-minded, and superintendents of general and insane hospitals, should be utilized in teaching in this department.

Actual work in epidemiology, the inspection of water, sewage disposal and garbage plants, systems of ventilation, milk depots, food producing industries, especially meat inspection, model as well as insanitary dairies, ice cream factories, etc., and the actual inspection of industries and occupations which are productive of particular diseases, should be included in the teaching.

Some teacher from the department of public health should give practical instruction on the public health side of infectious disease hospitals and, where possible, the actual daily work of municipal, county or state boards of health should be seen and participated in by the students.

It is not enough that a single individual, even if he is a professional hygienist, should give all the instruction. A lasting impression concerning the responsibilities involved even in the daily practice of medicine, quite apart from the possibilities of appointment to service in public health work,

can not be obtained from a mere course of lectures. The different workers, factors and fields involved, should be presented to the student so that he may realize more clearly what is expected of him in his private and public capacities.

Your sub-committee would not recommend that attempt be made to cover the whole field in compulsory courses. It feels, however, that the ground should be covered in such a way that on graduation the student will be in a position to meet his responsibilities which involve public relationships and be prepared at least to teach personal hygiene to his patients and their families and to cooperate with professional sanitarians, social workers, economists, the legal and clerical professions, educationalists, and others, as an individual and through his medical society.

Teachers in Medical Jurisprudence

The members of the committee were asked to discuss the teaching of this subject in relation to the giving of a part of the lectures by a member of the legal profession and as to whether toxicology, identification of blood as human blood, the satisfactory performance of an autopsy from a medico-legal standpoint, and other such subjects, be included under medical jurisprudence, or continued in the departments of chemistry, pharmacology, pathology, etc., as in most colleges. The question was further asked as to whether provision for practical laboratory and morgue work, as well as lectures, should be included, and that other points of importance should be raised.

Dr. Victor C. Vaughan, of your sub-committee, took up the matter fully and is quoted as follows:

"On this subject I have certain definite ideas, but in order to carry them out great changes would necessarily be made, and I am not sure that we have yet reached the point when we can with confidence attempt to bring about such changes. Forensic medicine is neither taught nor practiced in this country as it should be. A somewhat large experience as an expert witness in criminal cases has convinced me that such cases are, sometimes, thrown into utter confusion by the ignorance of both the prosecuting attorney and the physicians whom he may choose to get as his experts. Often the prosecuting attorney is some young man who has recently entered the profession of law, and it often happens that a murder case is his first case in the circuit court. He has had no experience, and is also devoid of any real knowledge concerning the steps which he should follow in the prosecution of the case. He is likely to call in to make the autopsy some young doctor who knows as little about it as does the lawyer, and between the two they get into a hopeless tangle, and the result often is that the proper prosecution of the case is impossible on account of preliminary mistakes.

"There should be in every state a forensic institute and laboratory, in which all medicolegal questions should be investigated, and in which research along this line should be constantly under way. Such an institution should be removed from political influences, and the best place for it would be as a department of the state university. Such an institute should be manned by a director thoroughly competent and well trained, and he should have assistants. Any prosecutor in the state should have the authority to call for an investigation of any criminal charge or any question as to insanity that might arise under his jurisdiction, and such an investigation should be made at a forensic institute by the director and his assistants. These examinations should always be made for the state, and when a case comes to trial the judge should be able to call the director of this institute into court, not for the purpose of giving testimony, but to advise with him concerning the expert testimony that is given by both sides.

"The work done in such an institute should be open to graduates in medicine who wish to become specialists in forensic medicine,

and at the same time the director of such an institute should give lectures and demonstrations as he may see fit to the members of the senior medical class.

"I do not think it worth while to develop this idea at present, but if something of this kind could be done, medical expert testimony would become more scientific and more valuable to the state, and it would be relieved of the opprobrium that is now, to some extent justly, thrown upon it. I think that we should move together for the accomplishment of the establishment of such forensic institutes. I have recommended that they be placed under university charge, and that they should be made departments of the university. This is to prevent them from falling into political hands. The director of such an institute should not appear as an expert for either prosecution or defense, but as an advisor to the court, and as a critic upon the expert testimony given by both sides. Such a director should be paid a good salary, and in addition to this he should have his traveling expenses when visiting any part of the state in aiding either prosecuting attorney or judge in the investigation or in the trial of a case.

"For the present, however, we can not expect to accomplish this very desirable result, and we will have to satisfy ourselves largely with lectures to the senior medical class upon the subject of Medical Jurisprudence. There can be no question that in part these lectures should be given by a member of the legal profession. The prospective medical student should be made thoroughly familiar with his duties from a legal standpoint. He should understand what rights he has, and what is of more importance, he should be made to thoroughly appreciate what his duties are, not only to his patient but to the state. The whole legal side of medical jurisprudence should be given in lectures to the medical students by a member of the legal profession unless it happens, as in some cases it does, that the professor of medical jurisprudence is both a lawyer and a physician.

"Toxicology should be taught in the pharmacological laboratory. The identification of human blood belongs to the work of the bacteriological laboratory, and the proper performance of autopsies should be taught by the professor of pathology. While I thoroughly appreciate the great need that there is in this country for more thorough and scientific work in forensic medicine, I am at the same time opposed to anything which will needlessly multiply our laboratories. I do not see how pharmacology can be properly taught without including toxicology."

It is apparent, therefore, that cooperation with the legal profession should be secured both for the education of the existing profession, through joint sessions of medical societies and bar associations, and special graduate teaching to doctors, chemists and lawyers in medicolegal departments or institutes which may be developed in medical schools with or without university connection. Graduate teaching could thus be developed so as to provide education to doctors, lawyers, chemists and others who need it. This would include coordinated work and teaching, under a trained and competent medical head, by lawyers, chemists, bacteriologists, pathologists, surgeons, physicians, neurologists and various medical specialists, so that all phases of medicine and medical sciences represented in court procedure might be considered and coordinated for those who are about to specialize in this subject.

Some coordination or articulation of the instruction given at present in medical colleges and some supplemental information should be given by a medical man of special training, who is in close touch wilth the basic and laboratory branches, whilst members of the legal profession should be employed, even in undergraduate teaching, if for no other reason than to point out to the medical student his limitations and responsibilities in the field of medical expert work.

These courses might perhaps be made of such a nature as to be suitable for law students.

Above all, however, it should be recognizeed that more than a single teacher is required and that members of laboratory and clinical staffs, who have already given pertinent instruction, should be asked to coordinate it later under competent supervision and directorship. This means that pending the creation of institutes or well-developed departments of forensic medicine which devote their whole time and energy to the work, legal medicine must be covered by a number of teachers and departments.

Teachers in Medical Ethics, Publicity, Economics, Organization, Relationships, Etc.

Dr. J. N. McCormack, chairman of the American Medical Association's Committee on Organization, and a member of our sub-committee, is responsible for the bulletin or circular No. 32, issued by the Association's Council on Medical Education, which should be developed into a manual.

It has been suggested that the American Medical Association should provide a small corps of itinerant lecturers on this important branch of undergraduate medical instruction. If from four to ten lecture hours were possible, the various college schedules could, by yearly arrangement with the American Medical Association's head office, provide for such lectures, at the beginning of each college year. This recommendation is made because in most communities there are few medical men, who by temperament, study, and experience, have qualified themselves to give the necessary instruction, which is so vital at this stage of the doctor's education in regard to his present professional, social, and economic relationships.

It is very apparent that preparation must be made for rapid rearrangement and great specialization in a large number of directions. This should include a course in business, in ethics, and in medical organization and a thorough survey of all the fields which demand medical cooperation and specialization. It is naturally a question as to whether personal hygiene should be provided for here under the chair of medicine or in a department of public health.

Dr. McCormack issued a circular letter to the members of the sub-committee, from which quotations are here given.

"After an opportunity to study doctors individually and collectively, which has never been given to any other man, I became convinced that nearly every evil existing in the profession, including the poverty and discord which have so crippled its private and public usefulness, can be easily traced to our medical schools, in spite of the fact that faculties of these have always in the main been made up of the very cream of the profession. This was not the fault of individuals, or of individual schools, but to the fact that most of these were privately owned concerns with no income except the fees from students. This was probably inseparable from a rapidly growing and loosely governed country, and the evil has grown to enormous proportions, and enmeshed a large per cent. of the very leaders of the profession, before the danger was realized.

"As a result of such a system, students naturally sought the point of least resistance, the schools having the lowest entrance and graduation requirements, and in the struggles for existence the schools pandered to the students, and this continued with most of them until the state laws broke it up. To say nothing of the undesirable classes induced to study medicine by these conditions, probably to some extent because the existence of abundant text books made it easier to do so, and also because it became the fashion, students were given the maximum of scientific knowledge, much of which it was expected they would soon forget, with a minimum of

training in the art of medicine and other practical things soon to be of daily importance to them and those entrusting health and life to them. For instance, recent graduates should be towers of strength for harmony in postgraduate and other county society work as soon as they locate, but it is usually found that they have had no instruction along these lines in most of even the best schools and they can not be induced to join until experience shows the importance of doing so.

"With the handwriting on the wall for the schools which have been weighed in the balance and found wanting, and the awakening in medical organization which has swept the country like a prairie fire, and which has revealed the necessity for radical changes in our methods of education as to practical affairs, not only has there been little improvement in the best schools in these matters, but even a failure upon the part of those in authority in them to realize that the rank and file of the profession and the licensing boards are being systematically educated to demand this reform in a way which can not be resisted. It is now realized that the failures of the schools to teach suggestive and mechanical therapeutics gave an opportunity for Christian Science and other fads alike disastrous to the profession and people, that there has been the same non-progressiveness and half-heartedness in public health, organization and all similar matters, and it will and should be urged that they lead instead of waiting to be led by professional opinion in the future."

It is suggested by the committee that in university schools, from other departments a few lecturers be provided, who by their instruction and presence would illustrate to the student the matter outlined in Dr. McCormack's proposed course of instruction. The department of economics could help in relation to organization and business methods; a professional teacher of ethics might be enabled to give medical students some practical view points. In any event, it would help to neutralize the individualistic tendency of modern medicine.

In medical schools not affiliated with universities, similar outside help might be employed.

If the American Medical Association can not see its way to provide itinerant lecturers, these outside local educators might be had from other educational institutions and their work supplemented and coordinated by the carefully selected medical man.

The actual work of the Organization Committee of the American Medical Association should be continued, and in county and other medical societies attempt made to bring these matters before the existing medical profession rather than to wait for another medical generation for the results desired.

Summary of General Needs

1. Federal, state or university courses for future specialists in public health. Carefully selected teachers, representing all phases of public health should be secured and their teaching coordinated. This will enable physicians, economists, social workers, statisticians, engineers, dentists, hospital superintendents, biologists, bacteriologists and others to supplement their previous knowledge. A broad election of subjects should be permitted and the length of the course and amount of work should depend on the object sought and the preliminary training of the individual. It would seem wise that a number of degrees or diplomas be granted in order that the degree or diploma might in itself indicate the training of the individual and the work for which he had prepared himself.

2. Departments or institutes of forensic medicine should be established either in connection with university, or state or federal service, where physicians, lawyers, chemists, pathologists, pharmacologists and others can secure the courses necessary to supplement the training already had and where, if need be, degrees or other qualifications are given which serve to indicate the preparation of the graduate in his special field of medicolegal usefulness.

3. Extension work of medical societies programmes. The scope of the medical society programme and activity should be very greatly broadened so that medical men, through their societies, are brought into contact with public movements, organized groups of social and charity workers, educationalists, and members of other professions such as engineering and law. Cooperation with the clergy is necessary also. Business methods as applied to medicine should be introduced into medical society programmes. Such a course of action would replace for graduate physicians, the undergraduate courses which should be given to medical students, in order to fit them in a general way for their responsibilities as medical men, but would in no sense serve as a school for the education of specialists. However, if the medical profession is to take its recognized place in the world, it is necessary not only to educate the medical student, i. e. the practitioner of the future, but to bring to those already in the field a recognition of their obligations.

4. Undergraduate instruction in public health, forensic medicine and medical relationships. Every physician of the future, should receive during his college days, a certain amount of instruction in all of the work thus far mentioned, in order that he may recognize the special branches of medical activity which reveal themselves at the present time and be enabled to support professional sanitarians, experts of forensic medicine and medical publicists in their special lines of work. It will be necessary for him to recognize lines of demarcation and to be broad-minded enough to refer problems to those who by special education and experience are better fitted to deal with them than is he.

Such general instruction as your committee has in mind for all medical students would enable the doctor of the future to meet his responsibilities as a citizen and as a physician and always to be in the forefront of movements for the betterment of mankind, and at the same time to fulfil his function as a teacher of personal hygiene.

The special function of this committee relates to the proper provision of such general courses for the undergraduate students and for this purpose the following detailed outline is provided:

Outline of Undergraduate Courses in Medicine

Your sub-committee has been instructed to report only on compulsory courses, for which 110 hours have been allowed, by the action of the New York meeting, out of a total of 3,600 to 4,000 hours.

It would seem wise to your sub-committee that the matter of elective courses be considered as has been done by the sub-committee on anatomy. If some satisfactory arrangement of a system of electives can be made, specialization in public

health, legal medicine or medical publicity, organization, etc., may be had in part, if not in whole, during the course which leads to the M.D. degree. There is no reason why an undergraduate should not begin to specialize in one of these lines as he would for a teacher in anatomy, or one of the basic medical sciences, or for special practice in the field of surgery, neurology, or some other so-called medical specialty.

The following detailed outline has been prepared to show

1. Something of the extent of the ground to be covered.

2. The number of hours of undergraduate instruction.

3. Recommendations for the kind and number of teachers to be employed in the creation of a special department.

4. Where it is necessary to avoid duplication of the work given in other departments, suggestions are made as to the securing of coordination in teaching, and note made of the ground to be covered by other groups of subjects assigned to other sub-committees of the Council. It is requested that provision be made for meeting these preliminary requirements of the departments of public health and medical jurisprudence in the laboratory and clinical courses which precede them.

I. HYGIENE AND PUBLIC HEALTH

1. The Legal Mechanism for the Control of Disease (Federal, State, and Municipal)

Particular attention should be paid to the rules and regulations of the state in which the college is located.

Every member of the senior class should be supplied with literature pertaining to federal, state, county and municipal laws, rules and regulations, so that he is thoroughly familiarized with his legal responsibilities as they relate to public health.

The subject may be given as a series of lectures or introduced when the various diseases and insanitary conditions which the legal machinery seeks to control, are taught.

Teachers. The executive officer of the state board of health, or of the leading municipality, is frequently more familiar with matters of sanitary law than any member of the legal profession.

Time. Six to twelve hours.

2. Vital Statistics

This matter is as important to public health as an accurate system of bookkeeping is to a modern business concern. Professor Fisher suggests that it be divided into two subdivisions, actuarial and practical. Illustrations by life insurance statistics, reports of census and state and county returns. Graphic illustrations and such books as Newsholme and Bowey might be recommended, although not demanded.

In the practical work, copies of blanks, if not already provided by the teacher who presents the legal mechanism for the control of disease, should be introduced and the student instructed as to the proper making of returns with something of the reasons therefor. (See below, I, 9a.)

Teachers. The actuarial work should be given by a professional statistician. The practical work might be presented by a professional sanitarian or health officer.

Time. Two to four hours.

3. Transmissible Diseases and their Epidemiology

The general principles which underlie the transmission of disease should be grouped in relation to public health, even if they have been covered by lectures and clinical and laboratory work under the bacteriology, pathology and parasitology of the various infectious diseases and in the courses on medicine and pediatrics.

It would seem desirable to give two or three lectures on the necessity of considering the following variables in relation to the method of prevention to be employed.

(a) The nature of the virus, microbe or exciting cause, as to its parasitism, rôle in infection of man or animals, resistance to harmful influences, its requirement of two or more hosts to complete its life history, etc.

(b) The atrium or gateway through which the virus gains entrance into the body.

(c) The distribution of the exciting cause in the infected individual and methods of its elimination.

(d) The rôle of intermediate carriers or vehicles.

(e) Our possession of specific means of protection, such as vaccines, antitoxins, etc.

Following this, the application of methods of study to the transmissible diseases common in the locality should be given. It would seem preferable to present in detail the variables which have to be considered and outline the method of approaching the study of a few of the important transmissible diseases rather than to give a hasty consideration to all of them, since the student when provided with a method of study which he has applied thoroughly to a few diseases is more likely to find himself able to adapt the same method to other diseases which may occur in the community into which he goes.

For practical epidemiology, the use of maps, record cards, laboratory and field methods, etc., must be illustrated. Under this heading, some of the diseases which should be considered are smallpox, cases of which should be seen and practical work in vaccination provided; pneumonia, scarlet fever, measles, diphtheria, typhoid fever, tuberculosis, yellow fever, and malaria; possibly also bubonic plague in certain communities.

Teachers. It may be found advisable to use a number of teachers in this particular phase of the work. A pathologist or public health worker might present the general topic of transmission of infection. Under tuberculosis, the superintendents of sanatoria, the executive officer of a department of health, a charity or settlement worker and others might be employed to advantage. If possible, field investigation of typhoid epidemics, of diphtheria, involving school children, and other such work should be included.

Time. Not less than twenty hours should be given to this work.

The sub-committees on medicine, clinical diagnosis, pathology and bacteriology are requested to provide for laboratory,

clinical, and lecture instruction in relation to methods of diagnosis in diphtheria, tuberculosis, typhoid fever, etc. It should also be pointed out that the public health application of these topics should be given at the time the work is done.

4. Occupational Diseases (not including infections)

It is the general consensus of opinion of the sub-committee that some instruction on industrial hygiene should be given in a systematic way. Where possible, under hygiene, visits to industrial and other plants should be made by the students and if illustrations of occupational diseases can be found during the inspection a much more lasting impression will be made.

Teachers. No recommendations.

Time. Probably 1 to 2 hours lecture, and 6 to 8 hours of field work.

Total = seven to ten hours.

The sub-committee on internal medicine, pathology, surgery, and toxicology are requested to see that the matter of occupational diseases is covered in each course.

5. Milk Supply in Relation to Disease

Even if instruction concerning pure milk, certified milk and Pasteurized milk be given in pediatrics, physiology, or dietetics, some definite and systematic instruction should be provided under hygiene. Legal rules and regulations should be considered and enough of the producers' and sellers' viewpoint presented to make plain the economic limitations and rights. Milk depots and both sanitary and unhygienic dairies should be visited. Methods of grading dairies, the use of score cards and other matters pertaining to bovine sanitation should be presented.

It would seem wise to coordinate bacteriological and chemical instruction, the consideration of food values and relationships to infectious diseases, under the department of hygiene.

Teachers. A professional sanitarian, a chemist, a bacteriologist, and possibly a veterinarian or milk inspector or perhaps also a milk producer or handler should appear before the class.

Time. From three to ten hours should be given to this subject, depending on the amount of field work in dairy inspection, inspection of ice cream, butter and cheese plants, which is afforded.

Laboratory work need not be provided under the course of hygiene but the sub-committees on bacteriology, chemistry, physiological chemistry and pediatrics should all provide for suitable instruction in their respective departments.

6. Food Supply, Meat Inspection, Etc.

These subjects should be reviewed under hygiene by some sanitary authority who is actually engaged in the work. Visits should be made to stock yards, abattoirs, packing plants, and food manufacturing plants so that the embryo doctor may know just how the work is conducted.

Teachers. It may be necessary to provide amongst various colleges, a cooperative, itinerant lecturer. Sanitarians, food

inspectors, physiologists, chemists, veterinarians might all be used as teachers by a symposium arrangement.

Time. One to two lectures by a trained veterinarian or chemist, who is engaged in the actual work of inspection, will be found desirable. The time will therefore vary from two hours to ten or more according to the amount of field inspection which it is practical to do with the students.

The sub-committees on bacteriology, chemistry, physiology and dietetics are asked to see that these departments provide the necessary laboratory work to enable the student to understand and apply the knowledge thus gained to the protection of private and public health.

7. Water Supply and Sewage Disposal

It would seem desirable not to introduce as a compulsory course, any special work in chemistry, bacteriology, biology or engineering and doubtless a course in the microscopy of drinking water is not necessary for medical students.

Under competent supervision, students should be taken to water, sewage disposal and garbage plants in actual operation.

Teachers. At least a part of the instruction in these subjects might well be given by an engineer. This is easily arranged in a university where there is a department of sanitary engineering and may be had in any large city through the municipal engineer's office, local board of health or a consulting water and sewage expert.

Time. The time to be devoted to this subject may vary from four to twelve hours or more, according to the opportunities available for actual field inspection and the number of teachers cooperating.

However, laboratory work should be provided in the departments of chemistry and bacteriology and the principles made clear so that the student may at least understand the practical procedures and the sub-committees on chemistry and bacteriology are asked to make provision for this in their curriculum.

8. Sanitary Engineering and Architecture, Including Plumbing, Ventilation, Hospital, School, Dwelling and Public Building Sanitation, Etc.

Some instruction in these subjects might well be given by an engineer who has the "Disease sense." Some familiarization with plans and blue prints, and a few general principles as to their interpretation should be provided.

Teachers. Sanitary engineer, professional sanitarian and perhaps an architect. Course should be correlated by one with medical knowledge, however.

Time. Probably from two to three hours should be devoted to lecture work for undergraduates. Additional lectures with practical work in the draughting room and inspection of plants in operation should be offered to the graduate student who is planning to take up the work of a professional sanitarian.

9. Social Economics

It appears desirable to the sub-committee that at least two to three lectures be given to undergraduate medical students by trained workers in this subject. Charity and settlement

workers are very apt to be fairly well provided with the "medical view point." In colleges which are connected with universities the departments of sociology and economics will easily provide teachers to cooperate under the guidance of the head of the department of public health. Team work between the medical profession, public hygienists, social and settlement workers will be beneficial to all interest.

Teachers. Professional economists, settlement or social or charity workers, or a physician who has practical connection with charities, organizations, dispensary, etc.

Time. One or two lectures and if possible some field or inspection work of actual conditions and conduct of the office of some organization. A total of one to ten hours.

9 (a). Economic Cost of Disease. Saving through Conservation

This may be articulated for the undergraduate student with instruction on vital statistics (see above I. 2), but the following suggestion is made by Professor Fisher for professional sanitarians.

"I think there ought to be a course in the economic cost of disease and the economic saving through the conservation of life, including a saving from industrial accidents, from the reduction of preventable diseases like tuberculosis, typhoid fever, meningitis, etc., and through the reduction of chronic diseases which diminish vitality, such as malaria, hook-worm disease, venereal diseases, etc. The course should also include the study of the statistics of deaths, morbidity statistics, and computations of cost of losses, together with computations of the cost of making improvements, such as the cost of building rat-proof wharves in San Francisco to rid the city of plague, or the cost of building filters to rid a city of typhoid fever, etc., etc. These are subjects on general information which could be presented in a way which would widen the horizon of the physician from his immediate practice, and fit him for taking part in public movements for civic betterments in various directions. The subjects I have in mind are, of course, those which I have tried to collate in my report to the Conservation Commission."

10. Publicity in Relation to Public Health

Even in undergraduate teaching of public health and of medical ethics and organization this subject merits a great deal of attention. Medical ethics should be restated in regard to the future development of relations of different branches of the profession of medicine, particularly as regards public health. It would serve a useful purpose if those who are engaged in educational propagandas would discuss in one or two lectures the conduct of the tuberculosis work, illustrating how publicity of a proper and most useful kind may be had. This would include street-car, newspaper, magazine, hand-bill, and other advertising devices. The medical student should be referred to magazine articles which are appearing in such numbers, and their defects concerning medicine and public health should be pointed out. Such a course of one or two lectures would prepare the student, when he located, to cooperate quickly and intelligently in public propagandas for the education of the public and the individual in relation to tuberculosis, typhoid fever, diphtheria, etc. This is very important because the average doctor, although willing to help, is hampered by his previous misconceptions as to his functions and is absolutely at sea when it comes to practical and proper

publicity, methods and popular metaphors, similes and illustrative material.

Teachers. Public health workers and propagandists who know doctors and their limitations.

Time. One to three hours lecture using plenty of illustrative material in charts, lantern slides, etc., etc.

11. Disinfection

Teaching on disinfectants in a practical way should be provided in the laboratory courses in bacteriology, where the testing of germicides on bacteria and the matter of practical disinfection, not of surgical instruments, but of the sick room, should be illustrated. A professional sanitarian who has had to deal with the practical application of methods of disinfection to sick rooms, hospitals, schools, etc., and is able to discuss intelligently the necessary steps for rendering safe the discharges, utensils, refuse food, clothing, etc., should sum up the teaching already given and supplement it If teaching has been afforded already in regard to insecticides it should also be supplemented and applied to practical household and field methods for dealing with flies, mosquitoes, and other vermin. Disinfection should include not only terminal disinfection of rooms, clothing, etc, but the disinfection of discharges in case of transmissible diseases, and general medical and sanitary asepsis which is at present far behind surgical asepsis in its development

Teachers. Professional sanitarian in actual practice in board of health work. Bacteriologist and chemist, etc.

Time. One to two lectures and practical disinfections or inspections of the actual practice of disinfection here or in preceding work in the bacteriological laboratory. A total of one to two hours additional to the bacteriological courses which precede.

The sub-committee on pathology and bacteriology is asked to provide time and place for this work.

12. Sanitation of Travel

Some information should be given even to the undergraduate student in regard to this matter, so as to coordinate the information he has already derived from his own experience as a traveler with the general teaching of the medical course. This should include street car, railway and other sanitary matters pertaining to transportation, although they are largely if not altogether included under disinfection, sewage and waste disposal, anti-spitting regulations and various disinfective processes illustrated elsewhere.

Teachers. Instruction should be given by a professional sanitarian who has studied these matters and perhaps preferably by a professional railway sanitarian, who is acquainted with the practical points of construction, operation and other questions important to the companies. Some inspection and practical demonstration is usually possible in any community.

Time. Probably not over one lecture need be assigned to this subject for undergraduates. A total of one to five hours.

13. Inspection of Hotels and Restaurants in Relation to Cleanliness, Sanitary Facilities, etc., and also Medical Inspection of Those who Handle Food, Water, etc.

Some separate consideration should be given to this matter, if only to stimulate publicity and create a demand for proper legal restriction and sanitary inspection. It might hasten the formation of satisfactory methods of inspection and proper record. The education of the public and of the profession, as to actual and imaginary dangers would help in tracing and preventing disease.

Teachers. No suggestion.

Time. It is probable that not more than one lecture is required

14 School Hygiene

Special instruction should be afforded under this head. It should include physical examination and the proper supervision of the study, gymnastic, calisthenic and other work of the pupils and, if need be, their homes. The relation of school life to transmissible diseases and the development of a proper relationship between the boards of health, school authorities and the experts employed should be made clear. Very effective team work between the public health and school authorities may be done in connection with reports of cases of transmissible diseases, etc.

Teachers. The subject should be taught by a professional sanitarian who has had actual practical experience in this particular work and who is familiar with the problems of the educationalist. In addition, probably one or more lectures should be given to the undergraduate students of medicine concerning athletics, physical culture, etc., by sone one who is actually engaged in this work in school, college, or university. In universities, some one from the school of education or pedagogy might well give one or more lectures to the medical students.

Time. Three to ten hours according to number of teachers used, the amount of practical work which it is desired to introduce and the opportunities for inspection or field work afforded.

The sub-committee which has to deal with orthopedics, diseases of the eye, ear, nose and throat, and internal medicine, are asked to provide in their schedules for a consideration of the work of these various specialists in the subject of school hygiene.

15. The Hygiene of Public Institutions for the Insane, Feeble-Minded, Deaf, Dumb, Blind, and Correctional Institutions

Both by lectures and by visits to such institutions, medical students should be familiarized with this work, in order that in their daily practice they may know something of the aims and conduct of the institutions and be able to inform parents, families and school teachers concerning the hospitals and training schools for defectives. They should also know something about insane hospitals, the legal methods of admission, etc., and the plan of treatment. This information is necessary in order that they may act as teachers of the public and stand as a unit for progress.

Teachers. A professional sanitarian should cooperate with the teachers in the subjects included and implied in the title. Superintendents, or other properly qualified officials from such institutions should be invited to cooperate in a symposium method of presentation at the medical college or better by conducting lectures and clinics at their various institutions, to which the senior class should be taken.

Time. From ten to thirty hours should be given to this work, dependent on the amount of field and inspection work which is desirable and possible.

16. Eugenics

Physicians should be trained so that they may be helpful in private and public as educators in relation to the selection of breeders of the human stock. In this day of paternalism and shifting of personal and parental responsibility, it would appear that in certain families the main responsibility taken is the begetting of children. Sterilization of the feeble-minded and criminals is being legally practiced in Indiana and something of the pros and cons of this movement should be presented to the outgoing medical men. Restriction in the issuance of marriage licenses, the filing of records concerning the physical condition of the contracting parties and other such matters should be dealt with.

Teachers. No suggestions.

Time. One hour or less.

17. The Hygiene of Venereal Diseases

Special lectures need not be given under the Department of Hygiene but the chair in charge of this work should be asked to present the public and private health aspects of this question as a guide to the medical student when he later becomes a teacher of the individual and the public. The matter should be presented impartially and fully by means of statistics, regulations, registration, etc.

Teachers. Professors of venereal disease.

Time. To be included in the regular course and not necessarily under hygiene.

The sub-committee on dermatology and venereal disease is asked to present this matter strongly in its report.

18. Sanitary Aspects of Embalming, Funeral Direction and the Transportation of the Dead

It seems desirable to help the embalmers to an understanding of some of the public health aspects of their work, as the sole responsibility of preventing infection is frequently thrown on them. Baggagemen, embalmers and sanitarians have mutual interests here.

Teachers. No recommendations.

Time. No recommendations.

19. Naval and Military Hygiene

The sub-committee makes no recommendation with regard to this subject further than that some few general principles should be outlined.

Teachers. No recommendations.

Time. No recommendations.

20. Tropical Medicine

Your sub-committee believes that the necessary teaching in tropical medicine for the ordinary medical student may be provided under section 3, page 28, of this report, and by special instruction in medicine, pathology and bacteriology.

Teachers. No recommendations other than above.

Time. No special attention or time under hygiene.

21. Personal Hygiene

The sub-committee considers that personal hygiene is the foundation of public hygiene and recommends that special attention be given to the coordination of teaching given by other departments, including chemistry, bacteriology, pathology, medicine, physiology, etc. Nutrition should be dealt with by the department of physiology and physiological chemistry under metabolism, food values, dietetics, etc. Conflicting notions as to food, exercise, clothing, individual habits of work, sleep, etc., should be harmonized and special instruction in regard to athletics and physical exercise developed into a systematic course of teaching.

The present campaign against tuberculosis develops, as a by-product, the proper education of the profession and of the public in relation to many phases of purely personal hygiene. If public campaign and education is undertaken in regard to typhoid fever, diphtheria, sound water supplies and other such matters, personal hygiene has to be taught in each one.

Your sub-committee, however, is firmly convinced that the medical student needs to have his miscellaneous teaching, received elsewhere, coordinated for him in his fourth year, so that he may in turn become a teacher of his patient and family how to avoid disease, and in the education of the public as to logical measures for the suppression of disease.

The matter of sexual hygiene requires definite teaching.

Teachers. Instructors in medicine, physiology, pathology, bacteriology, chemistry, etc. Some practical authority on exercise should give lectures, if possible illustrated by practical work. A systematic course should be developed and instruction given in the fourth year by combined and coordinated effort of these various forces.

Time. Fifteen to twenty-eight hours, chargeable to other sub-committees, however. The sub-committees mentioned above are asked to provide for this time and teaching in the fourth year, so that all the instruction pertaining to personal hygiene may be given in logical sequence by the teachers who have already instructed the students but who have not presented matters from this viewpoint. This will provide a definite system to guide the practitioner of medicine in his teaching work, which must be given every day to his patients and families.

An additional six hours may be charged to public health and hygiene for purposes of still greater coordination and extension of this subject.

22. Dental and Oral Prophylaxis

Whilst this is a matter which properly pertains to personal hygiene, it is one which has been neglected in many medical schools and is on that account perhaps deserving of some consideration. With the tremendous specialization of the present

day dental college, it seems very necessary that both dentists and physicians have a clear conception of the limits of their fields. It seems extremely important that under the supervision of the chair of medicine and the chair of hygiene, a dentist should give one or more illustrated lectures concerning proper care of the teeth and where the responsibilities of the physician end and those of the dentist begin. It is especially important that the condition of the mouth and teeth should be considered, not only in relation to infections but to nutrition. Detailed recommendations need not be given, because this important matter can be adjusted in practically every medical school.

II. MEDICAL JURISPRUDENCE

The necessity for using a number of teachers in the presentation of this subject and for coordination in the fourth year of the teaching which has been given in the first, second and third years by other departments, exists for this group of subjects just as in hygiene and public health. Pending the creation of departments or institutes of medical jurisprudence, instruction should be given to undergraduates by a medical man thoroughly trained in the various phases of the subject.

For discussion of the needs, see above, page 117.

Teachers. A medical man of wide experience in court procedure should coordinate the course and be responsible for the teaching. He should be assisted by well-qualified legal practitioners. In addition, the chairs of chemistry, pharmacology, pathology, medicine, neurology, and the various specialists, should each give an illustrated practical application of his subject to the matter of court procedure. It would seem better that all these chairs should give the instruction to the senior medical students in logical sequence.

Time. A total of 25 to 60 hours should be assigned to this subject.

The chairmen of the sub-committees referred to above should be asked to see that the requisite laboratory, clinical and didactic teaching is provided when the subjects are first presented to the students and that the same teachers are used again to instruct in a coordinated course in the fourth year, under the directorship of a competent head.

III. MEDICAL ETHICS, PUBLICITY, ECONOMICS, ORGANIZATION, RELATIONSHIP, ETC.

For detailed discussion, see above, page 119.

Either the Organization Committee of the American Medical Association or its Council on Medical Education should prepare a pamphlet or book outlining the various needs of medicine in these directions.

Teachers. Itinerant lecturers should be provided at first by the American Medical Association, on account of the scarcity in most communities of medical men fitted to give the desired instruction in certain phases of this work. In university medical schools, a few lecturers should be provided from the department of economics in matters of organization and business methods. A teacher of ethics should be employed to give one

or two lectures, and other men who may present other fields which require medical invasion should be used.

Time. Five to ten hours, in the latter half of the fourth year.

Recommendations to the American Medical Association

1. Provision of itinerant lecturers on medical publicity, organization, medical ethics, etc., who shall be available for teaching in the various medical colleges in the United States, a schedule to be arranged at the beginning of each college year.

2. Provision of illustrative exhibits to be loaned to medical societies so that frequently during the year, open public meetings may be held for the consideration of matters of personal and public health. Speakers should be very carefully selected and the proper publicity secured which by the combined effort of the membership of the society, is prevented from developing into advertising or quackery. The American Medical Association may itself make provision for such exhibits, or by cooperation with the U. S. Public Health and Marine-Hospital Service, state boards of health, universities, or state medical societies, stimulate preparation of traveling exhibits for the education of the general public by local medical societies.

3. Provision of a special section of the American Medical Association which shall have for its object the development of the public side of the physician's work. It is possible that the Section on Hygiene and Sanitary Science of the American Medical Association might undertake this development. Several years ago this section of the Association invited sanitary engineers to participate in the program, although the constition of the American Medical Association does not permit at the present time of membership of any other than licensed practitioners in any of the sections of the Association. This section would contemplate programs in which the special features would be provided by other than medical men.

Respectfully submitted,
F. F. Wesbrook, Chairman.

The Chairman.—The report presented by Dr. Wesbrook is a practical piece of pioneer work. Those who have been interested in medical curricula know how poorly hygiene and medical jurisprudence and medical economics have been presented in most medical schools.

I will now ask Dr. Geo. W. Webster to open the discussion on the medical curriculum submitted from the standpoint of the state medical examining boards.

The Medical Curriculum from the Standpoint of the State Examining Board

Dr. George W. Webster, Chicago

I was asked a few days ago to open the discussion on this subject from the standpoint of the medical examining boards. I am very glad to do so, chiefly because it gives me the opportunity to express my appreciation not only of this kind of

work, but of this particuar piece of work which this Committee of One Hundred has performed. I think from the standpoint of the examining boards, the report of this Committee of One Hundred is, without question, the most important piece of work the Council on Medical Education of the American Medical Association has ever done, and for many reasons. It is important from its educational point of view and not simply because of its value as a guide to examining boards. Of that I shall speak in a moment. In times past the curriculum of the average medical school might have been described as were the inhabitants of Europe in one of our very ancient histories, "a heterogeneous mixture of people promiscuously thrown together," and the average medical curriculum in the average medical school was, like the "peace of God that passeth all understanding." The work of this committee will help very much to correct this condition of affairs.

Now, we may inquire, Why is the medical examining board interested in a standard curriculum? The examining board is not engaged in medical teaching, but it is vitally interested in educational methods. Why? Because the examining boards have realized for a long time what many teachers and medical educators have not seemed to grasp fully when we discuss, as we do at such length, the character of the medical examination as conducted by examining boards. The examining boards must also take this position: If a young man is compelled to spend eight years at a grammar school, four years at an approved high school, the character of which is prescribed and approved, and then four years in a medical school in which there is a standard curriculum as described here this forenoon, and in which right methods are employed, then you have supervised that man's education for sixteen years, during which time the methods pursued by him in his education are correct, and the product must be good. We are interested, gentlemen, in the product. That is why state boards are interested in your methods. If your methods are correct, if the equipment is all that it should be, and we have supervised that man's education from the time he enters the grammar school until he leaves the medical school—sixteen years—I care very little whether he passes the medical examination or not, except as a matter of form. In such cases men will be better equipped for the practice of medicine because they will have been sifted out at the grammar school, the high school, and the medical school before they come to the examining board. The examining board is interested in the product and is vitally interested in the methods by which that product is produced. This work is of vital importance from an educational standpoint, but it will also be of very great value to examining boards for this reason: It is necessary for every examining board to have certain rules and to have a schedule of minimum requirements that are deemed requisite for a medical college that is to be considered in good standing. Such a schedule of minimum requirements was reported to this body a year ago, was satisfactory in every way, and similar to that which is in operation in the work of most of the examining boards. But such a schedule does not go

far enough. It is not quite specific enough. For example, in the rules of each of these boards we have a rule something like this: the character of the entire equipment, including teachers, laboratory equipment, clinical facilities, etc., "shall be such as obtains in the majority of medical colleges in the United States." Well, a college says, What is the character of the equipment that obtains in the majority of medical colleges in the United States. With perhaps the exception of Dr. Bevan, Dr. Colwell, or Dr. Zapffe, or perhaps some three or four men in the hall, there is no one that knows what that average equipment is. Neither the medical colleges nor the state examining boards have had any very clear conception of exactly what that equipment should be, and even among this picked committee there is not an absolute consensus of opinion, but very nearly so, as to what should be considered a standard curriculum or standard equipment. We have a schedule of minimum requirements, as adopted last year, and which is in operation by most of the state boards. If we can go one step further and describe to a certain extent the character of that equipment, and the character of teaching methods, if you please, that should be adopted by the medical schools, you can see how much advantage that will be. Of course, I want all of you to understand clearly that I do not believe we can or should adopt a schedule of minimum requirements that specifies how many hours shall be devoted to this or that subject, and exactly the equipment that shall be considered the minimum, but I do believe the boards can give this information to the medical schools in an advisory way—at least, for the present—and can have this as a guide for themselves in the conduct of the examinations. Later on we may be able possibly to specify more exactly in regard to the number of hours, in regard to the exact equipment, but there is danger in specifying too minutely just what is demanded in the way of equipment or the exact number of hours in each individual branch.

Some five years ago I presented to the National Confederation of State Medical Examining and Licensing Boards a standard curriculum, which was not original with me, but merely a continuation of the work that had been done by others, and in which I made certain arguments in favor of such a standard curriculum, and, with your permission, I will present them here, as I think they will bear very well on the present situation, and I see no reason to materially change my mind from that time to this:

"The adoption of a standard uniform curriculum will be in the interests of an improved, as well as a higher standard of medical education. It will add symmetry to the course. It will give to each subject that relative importance which rightfully belongs to it, and no more. It will enable students to receive due credit for work done in any recognized school which adopts and conforms to this standard, thus enabling them to take the first two years in institutions remote from large cities, going to the latter for the last two years of clinical instruction. It is the most important single step toward future inter-state reciprocity on a rational basis. It

will result in closing up some inferior schools of low grade. It will serve as a basis for reform in state board examinations. In most state boards all studies have equal rank, the applicant being required to answer to the same number of questions in each subject, a manifest injustice to the applicant. For example, some boards ask as many questions on physical diagnosis, gynecology, pediatrics and obstetrics, as they do in general medicine or general surgery, while the relative importance of these subjects and the relative time devoted to them is much smaller than to the major subjects."

I want to emphasize the fact that the greatest value of the work of this committee is in an educational way as a guide to the colleges in improving, standardizing and co-ordinating the work of medical teaching.

"A uniform standard will be set up for the whole country, instead of the heterogeneous regulations of state authorities. Singleness of policy will be substituted for the present unfortunate diversity of practice. It will unify and harmonize effort and will make possible the interchange of licensure, reciprocity. It will enable students to receive credit for work done and to make their scientific and laboratory instruction in one place or state, and complete their clinical course in the large cities, where there are abundant clinical opportunities.

"The medical degree will have a reasonably uniform standard of value, and will mean something to its holder.

"We realize that quantitative standards are educational evils, but sometimes it is 'any port in the storm.'

"We do not assume for a moment that what we have suggested is perfection; that we have attained the ideal; we know that after the summit is reached, all roads lead downward. We only offer this as a working plan.

"In this evolution of an ideal, or even a satisfactory, medical curriculum, I freely grant that there is no such thought in my mind as arriving at the ideal; there is no such thing as a stopping place, a resting place; but may there not be a halting place, where we may go forward as a unit, as a solid phalanx and not as stragglers, each one fighting by himself and for himself?"

Character of the State License Examination

Dr. Fleming Carrow, Detroit, read the following paper:

The character of the state license examination must, of necessity, depend on, and in its scope and limitation, be regulated and controlled by, the teachings in the medical schools. When you advance the standard of your schools, our scope is broadened; if you narrow your instruction and shorten your medical course, the licensing board must necessarily conform to your teachings or refuse to examine your graduates.

The state board is not an educational institution, any more than it is a detective agency, for the apprehension of unlicensed and illegal practitioners of medicine. It is a body created by statute, operating within the state which called it into existence, and is in its character judicial, executive and advisory. Its scope and its function, therefore, can no more be governed by the ideas of individual educators than can

the business of the interstate commerce commission be administered by the congress which created it.

It follows, therefore, that the function of the state licensing board must be advisory; to tell the educator what the law requires and it is the part of the educator to see that his school fulfils those requirements.

PRELIMINARY EDUCATION

If the law requires that a student beginning the study of medicine shall have had a standard high school education preparatory to that study, the board can not consistently admit to its examinations a graduate who has had less than that requirement. Less than that requirement may, in the opinion of the educator, be enough, but it does not fulfil the law governing such cases. The position I take, therefore, that the board is advisory as well as judicial and executive in character, seems to be a logical one.

The character of the state license examination: Is it good, sufficient and comprehensive? Or is it bad, inefficient and narrow? These questions all hark back to the academic one, is your medical education good? This, in turn, leads us to inquire, what of the preparatory school?

It seems to me that the senior year in the preparatory school should embrace more than the sciences. History should have a larger place in the mental preparation of the prospective medical student. The knowledge of at least the equivalent of "McLaughlin's History" should be insisted on; not alone because it is history, but because it is an eminently good training for medical study. There should be more to preparatory work than 60 counts. An elective course of study, best suited as the foundation of professional work, is of prime importance. Much more time might, with advantage, be given to the literature of at least two modern languages, some of which might be taken from physics.

MEDICAL TRAINING

As to the strictly medical training; if a man has been properly prepared in a preparatory school, four years is ample, if the medical college is a good one; if the instructors are trained teachers; if they are salaried men and can afford to give all the time necessary to teaching and do not have to shorten the lecture hour by the necessity of making a call, for a fee.

The man who comes before his class with a last year's lecture must not be surprised if his student fails when he reaches the state examining board, so, as I said, the character of the state examination depends on the character and fitness of the medical teacher.

If you think the state board is easy, may it not be because the educator has failed in his duty? One of my examinations in anatomy was pronounced too hard by one of the instructors at the University of Michigan, yet every student passed it, simply because the teacher who was then there was almost without a peer in this country. I knew that his students

could pass any examination you could give them in anatomy.

The art of imparting knowledge is not possessed by every man who writes "Professor" before his name. The really good surgeon is not always he who can make the most graceful curves in the air with a scalpel, but rather the one who, without the flourish of the studied gesture, makes his incision just where it should be.

The state examination will be comparatively simple if your school is proportionately thorough; and here the question should be considered: How shall the examination be conducted? Should it be written or oral? Should it be a laboratory or a clinical examination? Abroad, all four of these methods are in use. The written examination is, of all others, the poorest, yet it has the widest use. There are many men for whom it is easy to write a learned discourse (?) on any subject embraced in a medical course, and yet they may be totally unqualified for the practical side of medicine. It is a matter of common observation to see a man coming from a poor school, where there is but little teaching in laboratory and clinical work, stand high in a written examination.

His course has been largely a "cramming course" from quiz-compends; his written examination is quite in line with his habits of study and he passes well.

EXAMINERS TOO POORLY RECOMPENSED

As to the oral examination, the time which the average board member can give to such work, is not sufficient. Feeling that he is not recompensed by the state for his services, the first question he asks on arriving at the place of examination is, "When can I get a train home?" The remedy for this is to have a board, the members of which are not so actively engaged in practice that they can not give all the time necessary for the performance of this most important duty. The examiner should therefore be paid by the state.

The two remaining forms of test examination—in laboratory and clinical work, can not be conducted by the average state board man, because of his lack of knowledge of laboratory and clinical methods and technic. This again, could be remedied by the selection of laboratory and clinical men not connected with medical schools for the state board, these men to be under state commission and paid by the state.

THE IDEAL EXAMINATION

The ideal test examination would embrace all four of these methods, and it remains for this Council to suggest to the state board a plan whereby some such scheme may be made possible. The tests used to-day are inefficient and unsatisfactory, and it is to be hoped that in the near future, some remedy will be devised which will enable us to satisfy ourselves as to an applicant's fitness to practice medicine.

You, gentlemen, are absorbed in telling us how a man should be educated. We listen attentively and give weight to your advice. Does it not seem anomalous and out of the regular order, to expect the state examiner to do anything less than pass your student? Have you not prepared him for

amination has been a written one. Certain formal questions are asked and the candidate writes out the answers. That this is the easiest and the quickest method of examination no one will deny. That it is an absolutely unsuitable method every one who has been engaged in teaching and examining students will recognize. In the first place there is a very great difficulty in the preparation of questions which will really test a candidate's knowledge. It is only possible to ask a certain number of questions on any subject. In the yearly preparation of examinations certain questions will recur in spite of the examiner. It is hardly possible to ask more than in the beginning undoubtedly stimulated the schools but the one hundred questions on any subject. These examinations poor schools quickly rose to the emergency and their instruction was based not on rendering a student fit for the high duties of the profession but on making him capable of passing the examination. The matter of examination passing has been rendered very much more facile by the preparation of quiz compends in which the questions of state boards are analyzed and suitable answers given. Any man of proper intelligence by the use of such a quiz compend can prepare himself in the course of a few months for such an examination without any real medical training at all.

The examination for admission to the practice of medicine should not be a written examination, to show what the candidate remembers and can write, but a practical examination to show what he really knows and can do. The real efficiency of a medical man depends largely on his knowledge of methods of diagnosis and treatment and his facility in the use of these methods, and that a candidate has this knowledge and ability can only be tested by the actual demonstration. This, I think, will be admitted on all sides.

PROVISION FOR PRACTICAL EXAMINATIONS

The objections which are urged against such methods of examination are numerous. In the first place it is said that the examiners themselves at present are incapable of conducting such examinations. If this be true, and I hardly believe it, they should give up their offices to those who are capable of conducting such examinations. In accepting the position they have assumed certain duties, and if not capable of fulfilling them they should not occupy the positions. It is also said that the state boards have not the facilities for conducting such examinations. This is not true. I feel perfectly sure that every assistance will be given to the state examining boards by the medical schools in the state. They will offer their laboratories and all their facilities. The examination should not be held in places were facilities of this sort can not be provided. The laboratory side of the practical examinations is the least. The practical examination should embrace the clinical as well as the laboratory side of medicine. There is no difficulty whatever in providing material for the clinical

examination. In every city where the examination would be held there is enough ambulant dispensary material to provide for the examination. Even the facilities of a hospital would be extended to the state boards if they asked for them and used them properly. By this clinical examination the student should show that he is thoroughly trained in the methods of diagnosis by auscultation and percussion, and in all of the clinical methods; that he understands the principles of antiseptic surgery and can apply them; that he knows his regional anatomy and can apply his knowledge in the diagnosis of internal conditions. Another objection which is raised is that such an examination to be effective will occupy more time than the written examination. Undoubtedly this is true and more time must be given to the examinations. If the emoluments of the office do not justify this expenditure of time on the part of the examiner the emoluments should be increased. The state could easily meet the increased expense by exacting a higher fee for the examination. There is no reason why the fee should not be at least $100. The cry of the poor boy will be at once raised, but if the poor boy has the proper material in him he can easily get together the money. He has gotten together much more for his medical education. It is not justifiable to make a whole system of examinations ineffective by the lack of funds.

PRACTICAL EXAMINATIONS COMMON ELSEWHERE

We as a medical profession and as a part of the public should insist on this practical examination. The best medical schools would welcome it, because they do not fear the application of any suitable test to determine the fitness of their method. It will be opposed by certain of the schools who are training men to pass examinations as at present conducted. It seems rather absurd that we should say that the practical examination can not be held here when it is held in every country in Europe and in Canada. I can not avoid speaking strongly on the matter because it is one to which I have given a great deal of thought. It seems to me that the state boards have the matter of medical education entirely in their own hands. They can demand that the medical schools shall turn out a fit product. The state examiners hold the most important medical positions in the state. They have a greater responsibility than that of a teacher in a medical school, and greater than the state health officials. I firmly believe that they will rise to this responsibility and show that this country must not stand behind other countries in the selection of the men who are fit to enter the ranks of the profession. The practical examination will also do away with the difficulties arising from the different schools of medicine. If a man shows that he has knowledge of methods and facility in the application of these methods in the recognition and in the treatment of disease he can be trusted no matter under what medical sect he chooses to array himself.

DISCUSSION

DR. ARCHIBALD B. MACALLUM, of Toronto, Ont.: I am not so much interested in the queston of the licensing board and the results that flow therefrom as determining the status of medical education as I am in the subjects which have been discussed this morning. Nevertheless, when I was asked to add a contribution to the subject under discussion I felt, perhaps, I could say something which has resulted from our experience regarding licensing bodies.

In Canada all our provinces have licensing boards. Nova Scotia, New Brunswick, Prince Edward Island, Quebec, Ontario, the Northwestern Provinces and British Columbia. In Manitoba the university of the province is practically the licensing body. With the other provinces the licensing power practically remains with the medical profession, not with the state or province as such, and it may be interesting to you to know how that condition of affairs came about. It is not very long ago since it began to obtain, about thirty-six years ago in the Province of Ontario, quite as long ago in the Province of Quebec, and about the same time in the Province of Nova Scotia. As to the time when the profession had licensing power in the other provinces, I can say nothing, because I have not looked into the matter. But in the Province of Ontario, up to 1873, any one who could present a certificate from a medical school could go to the lieutenant-governor in council, and after complying with certain official regulations, be registered as a medical practitioner. The result was that there were many "isms" in the profession. There were quite a number of teaching bodies. There were altogether at that time four in the Province of Ontario, with a population of little more than one million. It entered into the minds of a few of the profession to organize a medical council or college of physicians and surgeons, and to obtain for it the licensing power. This meant, of course, a compromise. The eclectics, the homeopaths, and all the divisions in the calling of the profession had to have their pound of flesh, and they were granted representation on this Medical Council or College of Physicians and Surgeons. A bill passed the legislature and, of course, the council, as at first organized, was an *omnium gatherum*. But it set steadily to work, and the result is to-day it only contains representatives of two divisions, the regular profession and the homeopathic. There are less than fifty practitioners of homeopathy in the Province of Ontario, and these have five representatives in the Medical Council. There are more than 2,500 regular practitioners in this province, and they have something like seventeen representatives in the Medical Council.

It may be interesting to you to know what are the disadvantages as well as advantages of such a situation. I can not speak for the Province of Quebec. I believe some one else must speak about it, for I am not so conversant with what it has brought about. I know in the Province of Ontario it has resulted very well for the good of the profession. It appoints examiners, and these examiners hold examinations twice a year, written, practical and oral. Every student is

made to go through that mill. There are three examinations, one at the end of the second year, one at the end of the fourth year, and one at the end of the fifth year. Well, it has stifled the eclectic school. There is no homeopathic school. The student in homeopathy who wants to get homeopathic qualifications has to pass all the regular examinations with the exception of that on therapeutics. It has given homogeneity to the profession, and the licensing members worked solidly together. It is very, very conservative. It is difficult to get it to move. You know the great bulk of the medical profession is constituted of elderly individuals who received their medical education twenty-five to thirty years ago. The members of the council are mostly elderly gentlemen. They have not been in touch with the laboratory. They only know the purely practical side of their calling, and they are pretty insistent on it. They are inclined to overrate the importance of that, and consequently ignore the progressive side of medical education. But there is one further point about it which I think those of you who are interested would like to copy, especially the conditions which obtain with us. There is one thing which I think might be borne in mind as a disadvantage. Every examiner must be a practitioner of medicine disassociated from a school, or if he is a teacher in a medical school he must not examine on the subject which he teaches. The consequence is the examinations are not of the highest type. They are not as up-to-date as they ought to be, and so constant criticism is directed against it. It is difficult to change, however; it is hedged and fortified in its position by our provincial laws, and we can not alter it. There are certain things we are beginning to recognize. For example, we can not get examiners in the sciences, and by a recent change in its regulations it accepts the examinations in chemistry, in physics and in physiological chemistry of our medical teaching institutions. But that is just about the only thing the Medical Council does recognize. It is very difficult to get it to change its point of view. It holds that it is not concerned in turning out anything except those who can practice medicine well at the cross roads. Of course, that is a laudable object, but it is not everything, and it is a sort of ball and chain on the progressive element in the profession, and the progressive element in the medical teaching institutions. The council, however, has helped us very greatly. Through its influence we have succeeded in stifling corporations engaged in teaching medicine which are not equipped for that purpose. We have to-day only three medical schools in the Province of Ontario, one at Kingston, one at Toronto, and one at London. The output of these three schools is not very great. The output itself is not to be despised. It is not yearly what it should be by any means. The medical teaching institutions, and especially the University of Toronto, want to raise the standard, but it can not do, so as it would, because of the intense conservatism in the profession. I know of no body of men in which there is more conservatism than the medical profession, when it is fortified in its position by statute and legal privileges. If you ever intend to confer licensing power on any

body, I should say, do not give it over to the medical profession itself, for, however well intentioned it may be, and however willing it may be to raise the standard of medical education, it is unable to do so by reason of its training and of its past history. I said to-day at luncheon that the whole progress of the race depends on one-thousandth of 1 per cent. population. Well, now, a very large proportion of that one-thousandth of 1 per cent. is not found in the medical profession. I would suggest that the state board be carefully selected, and not subject to political influences, not given over in the selection to a faddist, a homeopathic governor, or some officer of eclectic persuasion, or to a person of christian science tendencies. It is highly important not to allow it to fall under the control of such, and the best board would be one constituted of representatives of the more advanced portion of the profession and a number of educated laymen.

Dr. Herbert Harlan, of Baltimore, Md.: I have been much interested in this discussion so far, but not with the expectation of taking part in it. I represent the State Board of Maryland, and our law has some peculiarities. I was particularly struck with what Dr. Councilman had to say, namely, that the whole matter hinged on the state boards; that the responsibility rests with the state boards; that the state boards must conduct the examinaion in a certain way and must keep the colleges up to a certain standard by trying to teach them. Our board happens to be appointed, not by the governor, but by the medical society. Our state medical society elects two members of the board each year, so that the responsibility for the boards rests with the medical profession itself. But we are created by state law and we must obey that law. State laws regulate these boards in almost every state. If we could regulate medical schools in such a way as to bring them up to certain standards, if they could be regulated by any state legislature or by any government up to the standard suggested here to-day, there would be no use whatever for state boards. State boards are a round-about way of getting at what we desire to have, namely, first-class medical colleges. To change our law in the least particular, whether it be a change in the fee for examination or a change in the examination or to regulate preliminary education, it must be put in our state law. And while our state law has been modified five or six times, it has many good features in it. Every time we make the slightest attempt to change the state law, we are in danger of having much that is good done away with. Christian scientists, homeopaths, electics, we do not have, but we do have optomerists and osteopaths. They combine together, and it is exceedingly difficult to get anything through the state legislature without compromise. In the last session but one we came near a hair's breadth of having the whole state law done away with. We are not over-anxious about improving our state law. It is a difficult thing to do, and we have pretty nearly come to the conclusion that it is important to let it alone. One clause of our law says that students of medicine must have a competent preliminary education; that the college must be recognized that gives a com-

petent common school education. We have no common school that we know of, and nobody knows what a competent common school education is. Our board has passed a resolution notifying all schools in the state that a competent common school education must be a four years' high school course. Each school has been notified to the effect that only those schools will be recognized that have a four years' high school course. Whether our board would be upheld by the courts in taking this position I am unable to say. It comes to the point that the medical profession must have their state laws brought into such shape that the state boards can do what the medical profession wants without having to go before every legislature and accept compromises. The responsibility, therefore, must not be put on the medical boards.

Dr. John L. Dickey, of Wheeling, Va.: This is the third meeting of the Council I have attended, and I am sorry I am not able to add anything of interest to the work of the conference. We have viewed with a great deal of satisfaction the work that has been done by this Council, and one thing in particular, namely, the five bad colleges which existed in Louisville have been merged into one good college. We have too many colleges now in the United States. The one hundred and fifty or more medical colleges in this country ought to be reduced to about seventy-five good ones.

Two years ago I stated that we magnified the function of the State Board too much; that we were not expected to have chemical laboratories and dissecting rooms, and God knows what, in order to conduct our examinations. The boys learned those things at college, and when they come before us, it is our function as members of a State Board to find out whether they have acquired sufficient scientific knowledge to be turned loose on the people. That is what the State Board tries to do. It is the filter paper in the last analysis that lets them loose on the community. We prepare the simplest, commonplace kind of questions, and at one examination we only turned down twenty-one out of thirty-five applicants. The thing to do is to test the scientific knowledge of these applicants. I prepare some of these simple questions almost *ex tempore*, and I do not care so much what the answer is as how they answer it. If a man sits down and answers a question intelligently and shows he knows something about the subject, and has common sense enough to give intelligent answers, then we think he can be turned loose on the community.

Two years ago we were compelled in West Virginia to examine non-graduates, but now through the influence brought to bear on the legislature we have only to examine the graduates that appear before us. I am sorry to note, however, that five states yet remain who examine non-graduates.

The gentleman from Canada spoke of the difficulty in connection with having an eclectic governor, a homeopathic governor or a christian science governor. I fully agree with him in that respect; but I consider it more important to have a governor who has not an osteopathic wife. (Laughter.) It is the women, God bless them, who cause us a good deal of trouble. It is the christian science, the eclectic, the homeo-

pathic and chiropractic women who influence legislators to place eclectics and osteopaths on State Boards. And the hardest fight we had was to keep osteopathy from being represented on the board. We succeeded. We have a State Examining Board of ten members, two from each congressional district. When an eclectic applicant comes up for examination, we call in an eclectic practitioner to examine him in these branches. We likewise call in an osteopath to examine a student in osteopathy. It seems to me members of State Boards should be appointed without any political prefrence. I have tried to carry out that idea by not supporting the last Republican governor four years ago, and he reappointed me as a member of the board. I voted for the Democratic candidate instead of the Republican, and still he insists on appointing me a member of the board, so that you can see I am not a political appointee. State Boards should be divorced from politics. State Boards should be composed not so much of purely scientific men as men of common sense and ability to judge the moral character as well as scientific attainments of the men who come before them. With these things in view, we can reasonably expect to have better men in the medical profession.

Dr. B. D. Harison, of Detroit: I quite agree with Dr. Webster and with the report of the committee that the curriculum should cover only those subjects which will be of use to the general practitioner. Fancy work should be cut out. There is too much work in the four years, and the curriculum should be arranged in a practical way.

Dr. Webster spoke of the required schedule of 4,000 hours. The Association of American Medical Colleges adopted that standard five years ago. I do not contend that it is perfect, but it is on paper and is itemized. The American Confederation of State Medical Examining and Licensing Boards also adopted it and so has the State Board of Michigan. As soon as the colleges could be notified they also immediately came up to that standard. Some of the old colleges have spent several thousand dollars in order to comply with it. The colleges are willing to do what is proper if they are properly informed.

The 4,000-hour schedule is only suggestive. According to the testimony of Dr. Webster, it required a large amount of work to forestall it. Dr. Kober went over the matter, and he arrived at about the same number of hours. It is not imperative on a college to adopt a certain exact thing. When the boards represented say that we demand thirty hours or sixty hours of bacteriology, although half that number of hours may be sufficient, it is time to alter that schedule. but we have not heard them say so. We do not want to enforce that schedule unless we hear from you.

The hour and equipment schedule given in detail may be wrong, but we want you to prove it is wrong. There has been a great deal of work done on it. It is there. It is a sign hung out. Let somebody deal with it until he can formulate a proposition which we can act on.

As to preliminary education and the two-year literary course, there are some colleges and some states that can bring their requirements up to that standard, but there are probably only one-fifth of the colleges that have signified their intention to do so, that can do so, practically. Some colleges can do it., others can not. The great point in the standard is the honesty with which it is administered and the methods.

The "equivalent qualification," so called, should be exterminated not only from the law, but from the college. It is used in all sorts of ways to get around the requirements. There are a number of cheap literary colleges, which, while they demand a high school diploma, admit students on "equivalent qualifications," which in a large percentage of cases do not amount to two years of high school work. A two years' course in a low-grade literary college is not the equivalent of an honest four-year high school course. What are you going to do about that?

The New York board accepts graduates who have spent but three years in a high school, and examines them on the fourth year. That method itself shuts New York out from England and from foreign countries. They (foreign countries) want the board itself to investigate that. They want the credential; they do not want the credential and the equivalent mixed up together. The *equivalent* means an *equivalent credential*, but not an *equivalent education*. That is where the mistake is made by equivalents. Equivalent means *equivalent credential*, not an *equivalent qualification*.

As far back as 1873 I had completed a four-year secondary course, and also had spent one year in a military college. Nevertheless, when I entered the literary department of an Ontario university I had to pass an examination. The college did not care *how long*, so long as I had spent time enough. I had to show what time I had spent and what my standing was. The literary college *examined* me for entrance and that is what every university should do. They should not depend on a diploma.

I entered the University of Toronto after my literary course, and spent four years there, and there is a record in the registrar's office for every hour of work I put in there. The institutions in this country until recently have not done that kind of thing. It is only justice to the graduates and to the public and to the colleges that this should be done. My principal plea is for an honest, straight administration, such as they have in Ontario, and which has given good results. I contend also that an honest administration on the part of state boards is more important than a two years' additional literary course.

Then, again, there will be a certain class ready to study medicine with a high school diploma, but without a two year literary requirement, that will go into osteopathy. They will go into optometry; they will go into the isms. We are promoting these things by going too fast. We have got to go a little slow. We must raise the requirements gradually. I have not the slightest objection to those universities which

have a proper course requiring what they like, but I do object to lowering the standard or making it difficult for boards to administer. I also object to an honest two-year literary requirement being modified by a dishonest and make-believe two-year literary course.

Now, medicine is trying to go up 100 per cent. faster than all the other learned professions, in a minute. What is to become of it all? We are simply playing into the hands of the quacks. That is the reason we have osteopathic and optometric bills, and everything of that kind. Do not force men or colleges to do something they can not do. You have got to go slow in this matter.

So far as the Council of the American Medical Association is concerned, we certainly approve of their action. We admire their work. But I think they have the wrong idea. They think and act the part of a national legalized board, and attempt to dictate not only to the colleges, but to the medical boards. The boards and colleges are willing to accept their suggestions, but they will not be dictated to.

THE CHAIRMAN: I must disown for the Council one statement made by Dr. Harison, that the Council sought in any way to dictate in these matters.

DR. HARISON: I mentioned the matter to get your official statement that you do not intend to do so, and that you have not.

THE CHAIRMAN: I shall be very glad to give Dr. Harison a definite statement. In the first place, we have no power to dictate. We have no means by which we can dictate. The Council is practically a committee on education, and its work has been that of a bureau of information on educational matters pertaining to medicine directly and indirectly. They have sought to give this information a wide publicity, and I can not help but feel that the wide publicity given has been productive of very much good. But so far as dictating is concerned, we have no means or power to dictate to any state board or to any medical society, or to any medical school. The arguments implied by the remarks of Dr. Harison against the elevation of standards sound very familiar to me. I graduated at Rush Medical College in 1883, at a time when the course consisted of two years of 21 weeks. A short time after that an effort was made to increase the course from twenty-one to twenty-six weeks. We had a very serious discussion, some maintaining that we would drive students into cheaper schools. Finally, it was agreed to raise the standard to twenty-six weeks. Later it was proposed to extend the course to three years. Some said it would drive students into homeopathy and eclecticism, and that it was impossible to raise the standard to three years. One of the very best known Eastern schools raised its standard to three years and then got "cold feet." It got a small class, and then returned to the two-year standard. It was not very long, however, before every school increased its course to three years. Then it was proposed to raise the standard to four years, and this time some were positive that we would drive students into the cheaper and poorer schools; that the better medical

schools could not survive, and that it was a mistake for us to go too fast. It was not very long, Dr. Harison, before every medical school in the United States had a four-year medical course. The position in regard to a further raise in the standard is simply this: We in this country are the only country in the world of any prominence that does not require practically a five-year medical course, with one year of training in the sciences of physics, chemistry and biology. It has been well shown by men who are interested in medical education that it is impossible to-day to study modern medicine without training in those sciences. The Council feels that is so, and it has given wide publicity to the effort to place American medical schools on a par with those of Great Britain and with those on the Continent. So far, fifty schools of known standard have adopted this standard, and I feel very confident they will carry it out. Fifteen or more other schools adopted it, but we have not considered them in our discussion. So far as dictation is concerned, on this point I have this to say: We have no power to compel a school in any sense to adopt this standard. It is the State Boards that have the power, and some State Boards have adopted such a ruling. We have not even suggested that standard to the American Medical Association, and we do not intend to do so for some time, because we do not believe it is the right time for such a standard to be applied in every state in the Union. We have, however, urged this strongly and shall continue to do so because we feel that within a short time it must be generally adopted. It really makes little difference as to the position of the Council on Medical Education on this particular point, since that standard is bound to come whether we urge it or not. There is no question on that point. We hope, however, that our urging the standard will lead to its earlier and more general adoption.

Dr. B. D. Harison: May I have the privilege of saying just a word or two more?

The Chairman: You may.

Dr. Harison: I have no grievance against the Council. I was discussing the subject from the standpoint of entrance. These men are ready to enter college. They do not mind a year additional after they enter a medical college, but they do mind waiting another year before they begin their study of medicine. I believe in the five-year course, if it can be carried out; but I want this course made practical. I have simply brought this matter up as a suggestion. I agree with the Council on Medical Education; I admire and sympathize with its work, and shall do all in my power to assist it.

The Chairman: I am glad that Dr. Harison and the Council are so nearly in unison on this point.

Dr. William S. Fullerton, of St. Paul: The State Board of Minnesota is entirely unanimous in the belief that the object of a State Board is primarily and all the time for the protection, not of the physician, but of the public against incompetent physicians. The personnel of our board consists of nine members, six of whom are from the regular school and three from the homeopathic school. You would hardly

recognize, were you to meet our board in session, that there was anything of a homeopathic nature about it. It has always been harmonious. There are no questions or points on which we can not agree. Our board is appointed by the governor for the term of three years. Our law permits reappointment for three years more; then a member must step down and out for at least one year. That, I think, is a bad feature, because just about the time a member becomes efficient on the board, provided you have a good appointment to start with, he has to give place to an unknown quantity, and the best work generally can not be done in this way. We have this advantage, however, that there is always enough of the old leaven remaining on the board to carry on the work with fair uniformity.

Our position with regard to requirements is this, that the high school certificate is not a sufficient preliminary. It is a sight to make angels weep to read over the examination papers of some of the graduates in medicine who have had a high school course, and have presented themselves to us for examination. A great proportion of them can not read fluently, write legibly, spell correctly, nor use the English language gramatically. Many of them do not show any evidence of connected thought. For this reason our board has made the regulation, which went into effect beginning with the 1908 school year, that matriculants, in addition to the entrance requirements of our department of arts in the State University, or some other university of equal rank outside of our state, shall have two years of the arts' course. That is preliminary: then a man may matriculate in the medical course. That, we hold, is none too much of a preliminary education for a man entering on so complex and so important a study as that of the science of medicine at the present time. That rule will be rigidly enforced. Every college in the United States has been served with a notice to that effect. It will not be enforced against the college. For instance, Rush Medical College may not adopt that requirement as a college. We will not refuse to recognize Rush, but we will refuse to recognize the graduate of Rush who has not had that preliminary education. We hold that the state of Minnesota has a right to regulate matters within its own borders. We are not putting up the bars against the rest of the United States. On the other hand, we are not going to have our state used simply as a dumping-ground. We say to the outsider, "You may come into Minnesota, but if you do so, you must meet our requirements."

With regard to this curriculum which has been mapped out here to-day, it is really immaterial to the Minnesota State Board whether you adopt that four-thousand-hour curriculum or three-thousand-hour curriculum, or any curriculum you like. Besides a good preliminary education, we insist that the course you do adopt shall be of sufficient length to properly teach the subjects which are embraced in a liberal medical education of the modern type. We will leave it en-

tirely to the teaching bodies, where I think it should be left, to regulate the curriculum as they please. We are interested only in the output.

Another thing which we have had under consideration for the last year, and which we will adopt probably within the next six months, is a practical examination. By a practical examination, I mean a clinical examination on the subject of medicine; a laboratory examination on histology, pathology and bacteriology, and I wish to serve notice now on the delegates from sister State Boards who hear me at present, that in our reciprocal relations with states which do not have that requirement, their licentiates will be subjected to a supplementary examination by us in those branches. All those who adopt a similar course will be admitted as they are. Your qualifications and requirements must be equivalent to our own before we will recognize your licentiates, and we concede to you the right of exercising the same privilege.

It was mentioned by one of the speakers that the poor schools would turn out a product that perhaps was fit for the cross-roads. I think that is altogether an improper point of view. Our experience in Minnesota is this: We have along the north shore of Lake Superior and elsewhere isolated points, small towns springing up, where the practitioner of medicine can not go around the corner and consult a specialist in surgery, a specialist in medicine or in any other branch when he has a difficult case to contend with. The man who has the care of the health and lives of the inhabitants of those places must be all and all in himself. He must have an education greater even than the man who starts in Chicago, St. Paul or in Minneapolis, because he can not call on ability from the outside. We therefore insist in Minnesota that our licentiates shall show satisfactorily to our board that they are competent practitioners of medicine. We look first, last and all the time—or try to, at least—to the health of the community, to the health of the people in our state.

Another matter that was spoken of was with reference to examinations that could be prepared for from quiz compends, particularly written examinations. That is true, perhaps. For that reason, Minnesota, in the last year or more, has refused to give out a list of its questions, because we have found that one publisher has issued a large compend of the questions asked by various State Boards. . . . This compend greatly assists those who present themselves for examination. We do not allow those who come for examination to bring books into the room for use. Of course, they may lay them on the windowsill, but they have no chance to refer to them during the examinations. We do not give out any longer our list of questions for publication. Of course, the questions may be obtained through the applicants themselves, but we are considering the matter of picking up all question papers and not allowing applicants to take them away from the room. We want to try to prevent this cramming process which applicants are bound to resort to. But this will not be so important a matter when we have adopted a practical examination.

Dr. William T. Sarles, of Sparta, Wis.: I would like to ask Dr. Fullerton whether the board of which he is a member is the only one in the state that grants licenses?

Dr. Fullerton: We have a special board of osteopaths. We have been unable to prevent that legislation. The optometrists have a board. The passage of these bills has been due largely to the inertia of the medical profession. The osteopaths got there. We have no connection with any other board.

Dr. Harold C. Ernst, of Boston: I wish to call the attention of the Council and the gentlemen here assembled to the difficulties that lie in the way of State Boards controlling examinations. The State Board of Registration of Massachusetts has been in existence for fifteen years. Every year, since its existence, imperfections in the law have been pointed out and efforts made to correct them in the legislature, but always without success. Seven years ago the board was placed on a salaried basis rather than one dependent on fees for its recompense.

The sentiment expressed here this afternoon that the State Boards have this matter in their own hands, can hardly be considered correct, so far as the Commonwealth from which I come is concerned. If there is any way by which a State Board can secure such control, I feel very sure the Massachusetts Board would be glad to be informed. In discussing the question of practical examinations it would be of interest to quote from a letter dated March 21 from the secretary of the board.

Speaking of the fact that I intended to come to this meeting, the secretary says: "I therefore desire to call your attention to the annual report of this board for the year 1908, in which the board says: 'In the examinations held this year the board has made a beginning in conducting them along the lines of practical work in microscopy, in the laboratory, and in demonstrations on the manikin. Our experience is that such work is practicable in several of the subjects examined on, and is best calculated to insure an actual test of one's qualifications to enter on the practice of medicine.'"

The secretary goes on to say: "There is perhaps little to add to the above. We believe we are making an important departure from the routine examination methods now prevailing in the states in general. This board is not satisfied that it can not properly test the applicant's fitness to practice medicine by a purely written examination. In our examination held March 25, 1909, 62 failed. The majority of the class made a poor showing in the laboratory in undertaking urinary analyses for albumin," etc.

"Applicants, from one of our schools, were hopelessly deficient in practical work. The microscope seemed to be an unknown instrument to them. We are pushing on this live work. We find it wholly practical with classes of from sixty to seventy. The use of the microscope, stethoscope, anatomic demonstrations, bandaging, the application of surgical dressings, etc., will hereafter figure prominently in our examinations."

One who reads the Massachusetts law wonders that it could have been placed on the statute books if the medical profession took any interest in this matter at all. It is the law, however, and it has been impossible to change it. The unsatisfac- condition of it, however, so far as wording is concerned, really makes no especial difference in this instance; it is the way in which the law is enforced that is of most importance. To show that this is done to a reasonable extent by the Board of Registration in Massachusetts, the imperfections of the law being borne in mind, it will be interesting to give you the total exminations and the rejections made during the last year. During that year there were 407 applications for registration to practice medicine in Massachusetts, and of this number 245 were registered and 162 rejected. It seems to me that this is an index that the board is doing good work and that it is going to help the work of meetings such as we have here.

Dr. Leartus Connor, of Detroit, Mich.: I have been greatly interested and instructed by these reports and the discussions. Pardon me, if for a minute I assume I am the people, and you are those who are preparing to take care of me when I am sick. The reason why we have such a vast array of those cults included under the terms psychic medicine, christian science, faith-cure, etc., is because colleges have made no preparation for those subjects nor have they taken them into account, nor does this curriculum consider them. Suppose my eyes get sore. We know that a large proportion of eyes are lost or become diseased because general practitioners are not trained to recognize and care for purulent ophthalmia. I am told that rubbing and kneading, physical manipulation, etc., do a lot of good. A lot of people believe in it, but little provision is made to teach it in medical colleges. A large mass of the people are, therefore, driven to osteopathy, massage, etc. All these laymen are practitioners, and the work that is being done by them to-day should be done by educated physicians. As a medical man, I believe that all of those things should be provided for and cared for. You all recognize that they are our pests in legislation, our pests everywhere, but until we have learned to do better the work those people are imperfectly doing they will continue to exist. There is absolutely no excuse in the world why simple ophthalmology should not be practiced by every general practitioner. I am an ophthalmologist myself and I know whereof I speak. A little while ago one or two practioners in a little town in Michigan by undertaking to do ophthalmologic work have driven the optometrists out. Gentlemen, that is the solution of the whole problem of optometry. We can wipe that out by teaching simple ophthalmology to every general practitioner. It can be done, and as our friend from Minnesota says, it is only because of the inertia of the profession that it has not been done before.

The other things are not so simple. It is up to the American Medical Association to tell us what good things there are in osteopathy, in massage, that the general practitioner can learn and use. Make a thorough investigation and then tell us what there is in mental therapy or christian science that we can use, and not interfere with our other work, we will

use it, and that will settle those problems. The same may be said with regard to dentistry. We lost it because we failed to teach it, and now it has passed into the hands of the specialists.

One other thing: Every bit of specialism should be wiped out of every medical college for general practitioners, and there ought to be medical colleges that teach specialism and nothing else. Then men who are willing can learn all that is to be known regarding particular specialties and know how to practice them. I know of no greater need than the establishment of one or more such institutions. Take everything pertaining to specialism out of the medical curriculum and see how it is simplified. Put in the medical curriculum only those things which can be learned as well as used by the general practitioner. When you have done that the general practitioner may know something of everything, and it makes no difference if he is in the woods of Michigan or Minnesota. He should know something of everything, but when he is confronted by a difficult or complex case, he should know enough to call in a specialist. When this is done there will be no need for lay practitioners.

Dr. H. B. Hemenway, of Evanston, Ill.: One of the fundamental principles in the American law is that there shall be three branches of government, the executive, legislative and judicial. In some of our states, as in Illinois, for instance, the state constitution is very explicit, that no person or group of persons belonging to one branch shall exercise any of the prerogatives belonging to another.

Professor Carrow in his remarks referred to the work of the examining board as being both judicial and executive. It seems to me that a clear distinction between the judicial character of a state board examination and its legislative actions can be made only by the state legislature, the executive department being entirely distinct. That is one of the fundamental things that must be recognized in our efforts to make progress. The supply and demand is one of the old standby expressions in the days when medical colleges were scarce. When physicians were not plenty it was necessary that a low standard of medical education be accepted in order that all communities might have such physicians as they needed; but in this day I do not think that in a state like Minnesota, like Michigan or Illinois, that such a demand is any excuse whatever for letting down the bars to the low grade. It is not a question of business, since the medical profession is not a trades union; it is not a matter of getting in as many possible, but it is, as Dr. Fullerton has pointed out, the business of the State Board to look out for the people and to see that they have protection; not that the different medical schools shall have special privileges, or that the students shall have special privileges. It seems to me that Dr. Harison's remarks relative to the foundation of education are entirely out of place. We can not say that the requirement recommended is too low.

One other thing: The number of applicants examined may be proportionate to the amount of money which the examiners receive. If the examiners are paid according to the fees re-

ceived, it is to their advantage to make as low requirements as possible, in order to attract the applicants to their particular state for examination. It is most desirable, therefore, that the members of boards of examiners should be paid salaries and not fees.

Dr. F. H. Gerrish, of Portland, Maine: I was very much pleased with the papers this morning. They show a prodigious amount of work well done; but the thing in this meeting that cheered me most was what Dr. Councilman said this afternoon; that the examinations conducted on the part of State Boards of Registration should be as practical as possible. That statement cheered me because Dr. Councilman is a member of the Council on Medical Education. Last year I spoke in deprecation of the method which the Council recommends for admitting students to medical colleges on so many hours or minutes of instruction. I advocated at that time a practical method of finding out whether the students had achieved as much as we thought they should have done. In other words, instead of accepting a certificate that the student has studied physics, natural history and so on, we should give him a practical examination in those branches before admitting him to a medical school. There is only one possible inference by the implication of what Dr. Councilman said and that is the Council must logically come to exactly that method of examination of those who want to be admitted to our medical schools. Students must show what they have learned in the number of hours or minutes they have had of instruction.

Some Results of Higher Standards of Preliminary Education

Dr. Richard H. Whitehead, of Charlottesville, Va., then read a paper entitled "Some Results of Higher Standards of Preliminary Education."

The revolution in medical education which has been going on in the past ten or fifteen years is characterized by four prominent features: 1. Better preparation of students before admission to the schools. 2. Thorough training in the fundamental medical sciences by laboratory methods as a means to such a good understanding of the subjects studied that the student shall be able to keep abreast of advances in medical science in after years. 3. Better training in the clinical branches by methods which permit and enforce personal study of disease and its management in living people. 4. The employment of trained teachers to whom teaching and investigation are primary, not secondary, considerations.

The first of these is the most important, since it is fundamental to the others; without suitable preparation of the student, other measures are for the most part ineffectual. Accordingly, while I have in mind in a general way all the features of the newer standards, this paper is concerned chiefly with the item of preliminary education.

TWO PRELIMINARY STANDARDS

As the result of conjoint action of various bodies, there are two standards of preliminary education now before us: The first demands the completion of a four-year high school course, or an equivalent amount of education. While it is

the present standard of the majority, perhaps, of our medical schools, it is recognized that it is far from satisfactory, and that it is merely a temporary halting place. The other requires, in addition to the high school course, a year's work in college chemistry, physics, biology and a language, preferably German. As a matter of fact, it means, in most cases, two years of college work, as our college curricula are now constructed. In 1910 this or a higher requirement will be in force in almost all of our university medical departments.

As I am connected with a school which for the past two years has been requiring for admission the completion of a year of college work in chemistry, physics and biology, your secretary has asked me to present a statement of our experience with, and some observations on, a requirement which is quite similar to the one which is to receive such wide adoption in 1910.

We may consider the subject from two standpoints: pathologic and economical. Pedagogically speaking, the requirement has been beneficial in various ways: The great maturity and more earnest spirit of the students are, of course, decided gains; and the technical knowledge and training in the fundamental preparatory sciences possessed by them have enabled the instructors to improve the character and quality of their courses greatly. But the greatest, the almost inestimable value of the requirement, in my experience, is the fact that it constitutes a barrier between the medical school and the obviously unfit. The incapable student, the chronic idler, and the man to whom the study of natural science is distasteful, are kept out of the school. I should say, then, pedagogically speaking, that the greatest value of the requirement is its efficiency as a sifter, separating the chaff from the wheat.

WORK IN PHYSICS AND BIOLOGY

I should like to digress at this point to say a few words as to the character of the courses in physics and biology, which, it seems to me, are desirable for the prospective medical student. The course in physics at the average college, so far as my experience goes, is either almost entirely theoretical with little laboratory work, or specialized and adapted more particularly to the needs of the engineering student. It is, in either case, a study of mathematics rather than of Nature, and it is often so difficult that students who are deficient in mathematical talent are almost certainly doomed to failure. Is it not possible to devise good college courses in physics designed to meet the needs of medical men, courses which shall be less mathematical and deductive, more experimental and inductive? And the courses in biology might be improved in my opinion by a fuller consideration of the great biological conceptions which have so profoundly influenced modern thought.

I come now to the economic side of our question. Ours is a small department of one of the smaller universities. The effect of the introduction of this requirement on attendance was to reduce the size of the entering class 50 per cent., and at the end of two years the total attendance has been reduced about 30 per cent., at which point, we hope, the reducing

process will stop. Recently I have examined the statistics of 21 representative schools which have raised their entrance requirements within the past few years; in many cases the increase was only to a high school course. The average reduction in attendance in these schools at the expiration of two or three years was 42 per cent.; that is, these schools suffered a loss of nearly one-half of their students as compared with the enrollment before the raise in standard. It seems perfectly clear that the wide adoption of the standard which we are discussing will produce a considerable diminution in the size of the annual increment to a badly overcrowded profession, accompanied by a great improvement in the average quality of that increment. The young medical man of the early future is going to be a much more efficient practitioner, and better able to lead and direct in matters pertaining to the public health.

In this connection we must not forget our debt of gratitude to those university presidents and trustees, who, in spite of the costliness of a modern medical school, and in spite of the general indifference of the public to the ideals of medical education, have had the courage and the wisdom to devote so much of their ability to this phase of public service.

ATTITUDE OF EXAMINING BOARDS

I come next to a most important consideration: What should be the attitude of the state examining and licensing boards to this standard? For a long time one of the principal functions of these bodies has been to persuade and compel medical schools to enforce a certain minimum standard of preliminary education—and doubtless there is necessity for a continuance of this function; but the situation is now, in a way, reversed, and the question is, Can and will the boards adopt the higher standard set up by many of the schools and advocated by this Council? It is clear that the boards of some localities can not do so; local conditions would not justify and sustain them. On the other hand, some boards more fortunately situated have already adopted it: and there are various other states whose boards possess the necessary authority and whose conditions fully warrant such action. The advantages of this standard to the medical profession and to the public would still be evident, no matter what action the boards may take; but it is certain that its benefit can not be reaped fully unless a considerable number of the boards approve and support it. In all probability many medical schools will continue to maintain just as low a standard as the boards will allow.

"Every situation in life has its advantages and its disadvantages." Let us glance for a moment at one of the disadvantages of the present situation. The recent inspection of medical schools, conducted by the Council, has revealed quite a number which, even under a most liberal system of grading, can not be regarded as doing acceptable work. Many of the states are protected against the graduates of such schools by the fact that their examining boards have the authority to refuse recognition to schools which fall below their standards.

But there are other states whose boards are compelled by law to examine any graduate of any medical school. Accordingly, the graduates of these discredited schools, being excluded from the majority of the states, will naturally gravitate toward to the places of least resistance; and numbers of them will get by the boards, if only written tests are relied on to stop them. There is in the present situation a distinct menace both to the profession and to the public of such states, which should be met promptly, either by holding practical examinations for license, or by securing the necessary changes in the medical acts.

MEDICAL EDUCATION IN THE SOUTH

Finally, a word as to medical education in the south and its relation to higher standards of preliminary education. Here, I regret to say, are located a considerable number of the schools which have been discredited by the Council; here almost none of the examining boards have the authority to discriminate between schools, and here it will be difficult to secure such authority from the legislatures; and here, through the operation of causes which are perfectly natural and well understood by all who are acquainted even superficially with the history of the country, popular education has lagged behind the progress made in many other sections, so that the proper educational basis for high standards in medicine has been developed very imperfectly as yet. There are a number of old and well-established medical schools in the south to whom the proposition to adopt the Council's standard would be equivalent to a request to commit suicide. And even if the schools were to be so obliging as to accede to the request, their places would be taken immediately by others not so good. The difficulties can not be met by the adoption of standards not justified by the local conditions; but I am confident that it would be a mistake, so far as the south is concerned, for this Council to lower the standard out of consideration for southern difficulties, or for any other reason. On the contrary, the south needs that standard as a goal to be striven for; and it must not expect other sections of the country to retard their own progress. It must, in large measure, work out its own medical salvation; not in fear and trembling, however, but with courage, patience and wisdom. That it can and will do so, I have no doubt. The revival in education—primary, secondary and collegiate—now going on in many southern states is, perhaps, imperfectly understood and appreciated in the north and west. It is a movement of great extent and power, well organized, and intelligently directed towards a definite end. Just at present the bulk of this effort is being expended on the secondary schools. The public secondary schools have been strengthened greatly, and 680 new ones have come into existence in the last three years. During the same time there are few southern colleges of any standing which have not increased their requirements by amounts varying from 25 to 150 per cent. Moreover, the material wealth of the south is increasing so rapidly that it promises soon to become a most prosperous country. The

spread of the idea of local taxation guarantees in the near future a system of public schools of definite and permanent importance. So that the day is not so very far off when there will exist the proper basis for high standards in medical education. Already the leaven of high ideals is working in at least three southern universities. And so, I say, do not worry about the south; it will work out its educational development in due time. In the meanwhile the Council can be of much service by stimulating, encouraging, helping—but not by lowering its standard.

DISCUSSION

THE CHAIRMAN: We are fortunate in having with us Mr. Abraham Flexner, who is with the Carnegie Foundation for the Advancement of Teaching, which is doing so much for education in general. I should like to call on Mr. Flexner to say a few words on this subject.

MR. ABRAHAM FLEXNER, New York: I am a rather unwilling speaker here this afternoon, and perhaps the most timely contribution I can make to the discussion is to take a leaf out of the experience of another man with whom you are all familiar.

Some twenty-five years ago, while an undergraduate in the academic department of the Johns Hopkins University, it was my good fortune to hear Professor Gildersleeve lecture on certain topics in Greek. I remember being struck with the fact that this distinguished Greek scholar published books only about Latin. I asked one of his older students who knew him well how this had come to be. He said Professor Gildersleeve maintained that no man should write a book about a subject until he had stopped growing in it. That is exactly my position in reference to medical education. I am still growing, and as long as I am still growing, I think the best thing I can do is to keep my peace. (Laughter). I thank you.

DR. WILLIAM H. WATHEN, of Louisville, Ky.: In a paper which I read in 1903 at the New Orleans meeting of the Association of American Medical Colleges, I contended that it would be many years before a requirement higher than a high school diploma would be exacted. Nevertheless, it is the duty of endowed institutions where they are able to do so to require a higher standard than a high school diploma. At the same time, we can not expect all the schools to adopt this high grade. We should encourage every school to adopt the highest grade possible. In order to do that, we should eliminate as many of the poor medical colleges in this country as possible. We certainly have to-day three times as many medical colleges as are necessary to educate the doctors that are necessary for the people of this country. By the elimination of say two thirds of the colleges now in existence we would have no trouble in arriving at satisfactory standards. How that elimination can be brought about is a question that has to be solved by each locality. It has been notably accomplished in Louisville by the colleges themselves. They united all the schools into one, are now working harmoniously and are determined to elevate the standard as far as possible. Further-

more, for three years we have had no control over the admission of students. They are admitted to matriculation by state authority the same as they are admitted to practice medicine. The student is admitted on a high school diploma or on examination, whereupon a certificate is issued to him. We may in time be able to adopt a higher standard if the southern states can be induced to unite their schools. In the near future I think there will be many mergers of medical schools, and I don't see why you can not unite some of those here in Chicago.

Dr. Egbert Le Fevre, of New York: I have often wondered why the New York medical schools have not accepted the two years' requirement of college work for admission. The University and Bellevue Hospital Medical School has been considering it for three years. We are in thorough sympathy with anything that will raise the standard of medical education to the highest point possible in the community in which we are located. Some of our institutions have been so blessed with worldly goods that they can demand any standard they wish. Others, however, are going along eking out a miserable existence. I have taken up the matter with the Education Department of the State, and we have considered the possibility of having a law enacted which will require two years of college work for entrance to medical colleges. Commissioner Draper said there was no hope of getting such a bill through the Legislature.

I agree with the educational requirements in chemistry and physics, and possibly in biology, and the two years' college course is the best way to acquire it. It is only a matter of a short time when people will demand that inorganic chemistry and physics be taught in an efficient, practical way. As to the biological course, however, a question arises as to whether the colleges can give an efficient course which will prepare students for that intensive work which they must do in medicine? Six years ago I canvassed personally and by letter the teachers in the science courses in the colleges of the State and asked them this frank question: "How many men are going into medicine from your college?" He replied, "1 per cent., half of 1 per cent., possibly 3 per cent.," and, regarding biology, the statement was made by him, "Why should we, for the small percentage of men who contemplate taking a course in medicine demand that type of biological work which is going to be of practical use to them?" Many colleges have agricultural departments connected with them, and their biological courses largely pertain to the biology of agriculture. One teacher said, "We will not change our biological course for the benefit of five men who want to enter on the study of medicine."

In New York state we are in hopes of exacting a requirement which will meet this demand, that men who are going into medicine must have knowledge of chemistry, physics and biology which is going to help them in their medical course. It may be demanded that they shall spend two years' in an undergraduate school in order to obtain it. If two years' in an undergraduate school is a valuable test for general culture, is it the best training for a medical student? From a wide

experience, however, I will say that on an average the two years spent in an eastern college educates men far away from medical thought. They go there with no particular purpose. Ninety-eight per cent. of the men entering college do not go there to prepare themselves for any particular profession. They go there to get what they call a liberal education, and no one knows what that is. The work is not intensive. The work in a medical school is intensive. I have never seen men that are taking dilettante courses take them with the intensity that students do medicine. While we have not exacted a two years' course preparatory to entrance to a medical college, it is not because there is no need for it, but because the colleges especially as they are organized in the east spend too much time over and above the subjects really needed prerequisite to medicine.

There is another side to the problem. Sixty-nine per cent. of our students last year, and already 68½ per cent. this year, have hospital appointments on examination. That means two years of technical work. Would the young men who are going into hospitals be willing to take two years of preliminary work? When a man devotes four years to medicine, and takes two years of hospital service, he likely to say, why should I cut my hospital service out for the sake of my two years in college? Therefore, in the east, where that condition of things prevails, it is a question of time and the opportunity which they have for their medical course. However, I favor a requirement that will give a man a broader training before he enters medicine.

Dr. John M. Dodson, of Chicago: To my mind, the most significant thing in connection with the curriculum discussed this morning was the emphatic statement of the chairman in starting out, that the curriculum reported to-day is advisory and suggestive and not compulsory. I wish very much our state boards of medical examiners would adopt a similar attitude. We have been facing an impossible situation in this country in the fear that the State Boards would so lock up the curriculum that all possibility of experiment and progress would be shut off, and that would be a great calamity.

Here in Chicago, for instance, the medical schools are preparing students for a dozen states or more, but let us say half a dozen. Already one state has specified a detailed curriculum, indicating twenty-seven branches, the exact number of hours that shall be devoted to recitation, to laboratory work, to clinical work, etc. Another state in the West has adopted a different curriculum; another in the far West has adopted one that differs still more. What are we going to do about it? I feel the force of what Mr. Flexner has said, that we are all feeling our way along the line of medical pedagogy; that we have a great deal to learn, and, it seems to me, one of the valuable means of learning these things is by the method of experiment, and it is not necessary for the protection of the health of the people that the state board regulation should be so specifically defined as to cut off experiment of that sort.

Some of the schools are trying in a small way the elective curriculum. Is it the best curriculum? Is it the right way?

We do not know. I do not surely, but we never shall find out until we try it. Some of the schools are trying the continuous session, using the summer months. Is this a good plan? I do not know. We shall never find out until we have experimented with it; yet under the rules of certain state boards graduates of institutions having a continuous session are absolutely precluded from examination for licensure in those states. Is that a reasonable position? I should like to urge that state boards make their examinations just as rigid, and especially just as practical as may be, and test the graduates of medical schools as rigidly as they can, but do not put bars in the way of progress, in the way of experiment, and in the way of trial of new, modern and possibly better educational methods.

Dr. John M. Simpson, of Morgantown, W. Va.: Mr. Chairman and Gentlemen: I want to speak briefly to this body about the dishonesty practiced by certain medical schools and state boards. There is absolutely no use in having a standard if we do not live up to it. We have a standard of a high school diploma for entrance to medical colleges. A great many medical schools do not live up to it. They wink at the students who do not have this knowledge, and they admit them with a knowledge of the deficiency. In West Virginia we have had to contend with ill-prepared students, so that most of them have to spend a year or so in the preparatory department before they can enter the medical school. Students say, "Can I enter your school?" We ask them the question, "What are your requirements?" They say, "I have a state certificate." Well, a state certificate in West Virginia simply means that a person is licensed to teach grammar school subjects, such as arithmetic, a little bit of grammar, a little bit of United States history, etc. That is the sum total of their educational requirements. That is not enough preliminary education for entrance to a medical college. We urge them to take four years in a preparatory department, and at the end of that time they can enter as medical students. But they say, "We don't like to spend four years in a preparatory department to get into a medical school." The College Association says that "in lieu of a high school diploma, a man may present from a state licensing board evidence that he has the prerequisites." In lieu of that, you can take a certificate from a state superintendent of schools, but it presupposes that the state superintendent of schools examines a man on the same subjects as those students who have secured a high school diploma. In other words, that they are examined on all the subjects of the high school. The State Board of Kentucky or the schools in that state are not as careful as they should be with regard to the preliminary qualifications of the men they admit to their medical schools. I can recall the names of three or four students in the University of Louisville, who had been previously in the West Virginia University, who had been registered as special students. One was entered because he was a school teacher, but he had nothing but a first-grade certificate. He stayed until about Christmas, found the work was too hard for him and said he was sick. Later he turned up in Louisville. We had another man with-

out proper entrance qualifications who went to Louisville, and who is now, I believe, in the second year of his studies. Another man was a reporter on a newspaper, but who could not write English. He matriculated with us as a special student, but we found he did not possess the requisite preliminary qualifications, and to-day he is in his second year of work in Louisville. It is awful to have to knock people like that, but what are we going to do about it? I believe all schools of medicine should live up to the standard. Such men should not be allowed to leave West Virginia and go to Kentucky and be accepted, on the ground that they can get through quicker and easier there than they can with us. The state law says that a man must be a graduate of a reputable school, but we do not know whether such a school is as good as our own or not. The word "reputable" is not clearly defined. To my mind, this is a bad condition of affairs, and it ought to be remedied. I do not know how to do it.

Dr. F. C. Waite, of Cleveland, Ohio: The one greatest need in medical education is honesty in the administration of entrance requirements. A great many schools find it difficult to enforce the published requirements they have at present. Some years ago I made the remark that "the greatest amount of American fiction is to be found in medical college catalogues." Published requirements are not lived up to. Men are entered in some colleges with a large number of conditions, and these conditions are never made up. The men are never called on to fulfil those conditions. I do not know whether the Council can do anything in the matter or not; but we need some education in ethics with regard to entrance conditions in medical colleges. It is a serious fault and all of us know it.

Dr. Councilman: The way to solve all these difficulties is by practical examinations on the part of state boards.

Dr. Herbert Harlan, of Baltimore, Md.: With regard to the standard of preliminary education, I wish to say a word or two from the standpoint of a member of a state board. I have been on our board for five years. Five years ago we had 150 to 180 applicants for the spring examination and from 40 to 60 for the fall examination. The papers, as we read them, showed an absolute lack of preliminary education in a considerable percentage of the cases. The spelling was bad; the grammar wretched. It was customary at the Alumni Association meetings year after year to have some member of the board call attention to these defects, so utterly absurd and ridiculous were some of the papers. As a result, we voted and argued for a higher standard of preliminary education, and I am glad to say that to-day we do not have 1 per cent. of those papers that showed bad grammar, bad spelling and bad English. The standard of preliminary education has been greatly raised, and the papers show that the preliminary education of the applicants is much better.

Dr. Rhett Goode, of Mobile, Ala.: I take this occasion to thank the representative of the University of Virginia for the consideration and kind words which he spoke of the South.

It is unnecessary for me to go back to the recent history of of our section of the country and to tell you we have had very

trying affairs to deal with; and in addition to that, as a result of our unpleasantness we have had our financial resources reduced. In the state from which I come, Alabama, the people have gone perfectly wild on two questions. One is education, which is the principal thing, and the other is that people can not any longer indulge in alcohol. (Laughter and applause.) Doubtless the question of alcohol will regulate itself if we educate the people in regard to it. The present governor of our state has done more for Alabama than has been done in the past twenty-five years. He has appropriated large sums of money for colleges and the university at Tuscaloosa. In addition, our legislature has passed a bill which gives a high school to every county in the state of Alabama, and some twenty or thirty have been organized within the last year, so that we are progressing as rapidly as possible to put ourselves where we all want to be.

We all admire and give due credit to the Council for the work which its members have done, and they have done good work. It has stimulated us, and it has stimulated all of the colleges in the South. Some colleges in the South have more money, more endowments, and can be a little more independent than others. The college I represent has been in existence for more than fifty years. It has been conducting itself honorably; it has not done what it seems other colleges have done, jugging from the insinuations that have been made. The members of the faculty have kept their obligations. Our college has been an honored member of the Southern Medical College Association, and we have conformed to the strictest letter of their law, and we have helped somewhat in raising the standards. But that standard is not high enough for us, and just as soon as we can procure those students that have been blessed with a higher preliminary education, then we will increase our curriculum. We will not only increase the requirements, but we will also increase everything else that pertains to giving them a liberal and a refined medical education. In other words, as one of the speakers very properly said, our graduates will be fit not only to practice medicine in Alabama, but to practice it in Chicago, New York, or any other large city, and I am proud to say many graduates of our institution are among the leading doctors in many of our large cities, some in New York and a few in Chicago. They are scattered broadcast over the United States.

I have enjoyed my visit to this conference very much. I shall go back to the South with more enthusiasm than I thought it was possible for me to take away from the remarks I have heard in this meeting. Some of the remarks have been eminently practical. I shall take advantage of these and give the students the benefit of what I have heard.

DR. WHITEHEAD (closing the discussion): I feel disappointed in the results of my paper. The Secretary asked me to write a paper that would elicit a good deal of discussion, but I find the discussion has been on everything else except preliminary education, so I hardly know what to say, except to remark that we are so satisfied with our course that we would disband tomorrow if we had to give it up for any cause.

Just one other point that has nothing to do with my paper, and that is the question of honesty of medical schools. The cure for dishonesty on the part of medical schools is publicity. If this gentleman (Dr. Simpson) will publish the facts in the medical bulletin and scatter the bulletins broadcast it would be the quickest way to stop it.

THE CHAIRMAN: I wish to thank you in the name of the American Medical Association for being here as delegates today. I am sure this discussion has been profitable, and with the wide publicity that will be given to it, it will be very effective, and will be a step forward in this work for better standards.

I would like to close the proceedings with the statement that we have great reason to feel optimistic. I should not want to have anyone feel that this work has been accomplished, because I believe we are just beginning it. That is the best stand to take. Still we have the right to feel optimistic as to the future of medical education in this country.

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