

THE ASSOCIATION

— OF —

AMERICAN MEDICAL COLLEGES

ISSUED BY

PERRY H. MILLARD, M.D., Secretary-Treasurer

ST. PAUL, MINN.

ST. PAUL:
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1892.

OFFICERS

OF THE

Association of American Medical Colleges

FOR THE YEAR 1892.

President,

NATHAN S. DAVIS, M.D., LL.D., Chicago, Ill.

1st Vice-President,

J. E. ATKINSON, M.D., Baltimore, Md.

2d Vice-President,

A. VANDEVEER, M.D., Albany, N. Y.

Secretary-Treasurer,

PERRY H. MILLARD, M.D., St. Paul, Minn.

Members of the Judicial Council.

DUDLEY S. REYNOLDS, M.D., Louisville, Ky.

VICTOR C. VAUGHN, M.D., Ann Arbor, Mich.

WM. H. PANCOAST, M.D., Philadelphia, Pa.

JAMES H. ETHERIDGE, M.D., Chicago, Ill.

AARON FRIEDENWALD, M.D., Baltimore, Md.

A. VANDEVEER, M.D., Albany, N. Y.

HENRY D. DIDAMA, M.D., Syracuse, N. Y.

The immediate factor leading to the organization of this Association was the subjoined circular, issued to the profession and representatives of the various medical colleges of the United States. This circular was issued by the professional representatives of the various medical colleges of the city of Baltimore, Md.:

CIRCULAR.

75

To the Medical Colleges of the United States:

The following Baltimore medical schools, University of Maryland, Baltimore Medical College, College of Physicians and Surgeons, Baltimore University, Woman's Medical College of Baltimore, and the Staff of the Johns Hopkins Hospital, having met for the consideration of reforms urgently needed in the system of medical education hitherto in operation in this country, after a full discussion of this most important subject, have come to the conclusion that it is not expedient, nor indeed practicable for the medical schools of any State to assume *alone* the responsibility of adopting advanced methods. Yet fully convinced of the pressing need of a change and earnestly desirous to see it consummated, they are unwilling to let matters rest longer as they are, without at least an effort on their part to improve them. They have determined, therefore, to issue this appeal to the medical schools of the United States for their co-operation in inaugurating a *national advance*. Fully aware of previous ineffectual efforts in this direction, they yet realize that times have greatly changed since these efforts were made, and they believe that a repetition of them at this time would have a good prospect of success. The approaching meeting of the American Medical Association, drawing delegates, as it will, from every part of the country, offers a good opportunity for convening those who are interested in the contemplated changes. We therefore invite you to join with us in holding a conference for the full consideration of "Medical Education in this Country and Measures for its Improvement," and we request that you will appoint, at your earliest convenience, one or more delegates from your Faculty to represent it at a meeting to be held at Nashville, Tennessee, on the 21st of May, 1890, at 3 P. M. It is requested that delegates should be instructed, as far as possible, as regards the wishes of their Faculties upon the various measures now proposed in connection with advances in medical instruction, in order that definite results may be arrived at with the least possible delay and trouble. The following subjects are considered as most likely to come up for discussion:

1. Three Years' Course of Six-Months Sessions.
2. Graded Curriculum.
3. Written and Oral Examinations.
4. Preliminary Examination in English.
5. Laboratory Instruction in Chemistry, Histology and Pathology.

A. FRIEDENWALD, M. D., President,
EUGENE F. CORDELL, M. D., Secretary,
On behalf of the Baltimore Faculties.

BALTIMORE, March 20th, 1890.

(Please notify Dr. Eugene F. Cordell, No. 2111 Maryland Avenue, Baltimore, Md., of the action you may take regarding this circular.)

In response to the above circular, representatives of a majority of the regular medical colleges of the United States convened in the senate chamber of the capitol at the City of Nashville, Tennessee, at the hour designated.

Upon a full discussion of the propriety of such an organization and its probable influence upon medical education, it was unanimously decided to organize an association to be known as **THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES**. Prof. Aaron Friedenwald, of Baltimore, was elected temporary Chairman, and Winslow Anderson, of San Francisco, Secretary.

Upon motion the chair appointed a committee on permanent organization, consisting of the following named persons: Profs. N. S. Davis, F. J. Weed, David Street, W. H. Pancoast and Chas. E. Mainere.

The committee submitted the following names for officers for the ensuing year:

dec rec President—N. S. DAVIS, Chicago, Ill.
P 18 1st Vice-President—AARON FRIEDENWALD, Baltimore, Md.
smo 2d Vice-President—H. D. DIDAMA, Syracuse, N. Y.
W. H. N. S. 3d Vice-President—T. MENES, Nashville, Tenn.
W. H. N. S. 4th Vice-President—S. LOGAN, New Orleans, La.
W. H. N. S. 5th Vice-President—W. H. PANCOAST, Philadelphia, Pa.
W. H. N. S. 6th Vice-President—C. A. LINDSEY, New Haven, Ct.
W. H. N. S. 7th Vice-President—W. F. PECK, Davenport, Ia.
W. H. N. S. Secretary-Treasurer—PERRY H. MILLARD, St. Paul, Minn.

The President appointed the following Committee on Constitution and By-Laws, to report at the second annual meeting to be held in Washington in 1891: Perry H. Millard, St. Paul, Minn.; Wm. Osler, Baltimore, Md.; Samuel Logan, New Orleans, La.

The second annual session of the Association of American Medical Colleges convened at the Arlington Hotel, in Washington, D. C., May 4th, 1891. Profs. Osler and Millard, of the Committee on By-Laws and Constitution, submitted the following resolution, which was adopted:

** Minimum of Requirements.*

Rules governing admission of colleges to membership in the Association of American Medical Colleges:

(1) Colleges, members of this Association, shall require a course of graded instruction covering a period of three courses of lectures, of not less than six months' duration each, before conferring the degree of M. D. The instruction to cover a period of three years, no two courses to be afforded in the same year.

(2) That both oral and written examinations be required of all students.

(3) That a thorough course of laboratory instruction be maintained in Chemistry, Histology and Pathology.

(4) That a preliminary entrance examination be required as follows:

(a) A composition written in English of not less than two hundred words.

(b) The translation of easy Latin prose.

(c) An examination in higher Arithmetic or the elements of Algebra.

(d) An examination in the elements of Physics.

(e) It is provided, however, that students, graduates or matriculates of recognized colleges of Literature, Science and Arts, or graduates of Normal Schools directly supported by the State, be exempt from the provisions of this examination.

(f) Students may be allowed one year to remove a condition in Latin.

The following named persons were appointed to report at the next session such additional by-laws as may be deemed necessary, and to prepare a suitable seal for the use of the Association: Profs. Dudley S. Reynolds, Aaron Friedenwald and Robert Reyburn.

List of Officers

elected at the second annual session:

1891

President—N. S. DAVIS, M.D., LL.D., Chicago, Ill.

1st Vice-Pres.—McLANE TIFFANY, M.D., Baltimore, Md.

2d Vice-Pres.—P. O. HOOPER, M.D., Little Rock, Ark.

Sec'y-Treas.—PERRY H. MILLARD, M.D., St. Paul, Minn.

Members of Judicial Council.

DUDLEY S. REYNOLDS, M.D., Louisville, Ky.

VICTOR C. VAUGHN, M.D., Ann Arbor, Mich.

WM. H. PANCOAST, M.D., Philadelphia, Pa.

WM. F. PECK, M.D., Davenport, Iowa.

JAMES H. ETHERIDGE, M.D., Chicago, Ill.

AARON FRIEDENWALD, M.D., Baltimore, Md.

A. VANDEVEER, M.D., Albany, N. Y.

The third annual session of the Association convened at the Detroit College of Medicine, Detroit, Mich., June 8th, 1892.

The report of the Committee on By-Laws was referred back to the committee for further amendment and subsequent submission to the Secretary for publication. The President, Prof. Davis, submitted a paper upon the following subject, to-wit: "To what extent should clinical instruction be afforded students of medicine in regular course." Prof. Victor C. Vaughn submitted a second paper as follows: "To what extent should laboratory instruction be afforded students of medicine in regular course." The paper was discussed by Prof. Bayard Holmes, of Chicago. Upon motion

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it was voted to postpone further discussion of the subject of laboratory instruction until the next annual meeting, and that Prof. Rignald H. Fitz, of Boston, be invited to open the discussion of the subject by a paper at that time.

The fourth annual session of the College Association will be held in Milwaukee, Wisconsin, during the session of the American Medical Association in June, 1893.

4/2 to 1893

LIST OF COLLEGES.

The following named colleges have been represented by delegates present at the various meetings of the Association:

ALABAMA.

Medical College of Alabama, Mobile.

ARKANSAS.

Medical Department Arkansas Industrial University, Little Rock.

CALIFORNIA.

Medical Department University of California, San Francisco.

COLORADO.

Medical Department University of Colorado, Boulder.
Gross Medical College, Denver.

CONNECTICUT.

Medical Department Yale University, New Haven.

DISTRICT OF COLUMBIA.

Medical Department Columbian University, (National Medical College,) Washington.

Medical Department University of Georgetown, Washington.
Medical Department Howard University, Washington.

GEORGIA.

Medical Department University of Georgia, Augusta.

ILLINOIS.

Rush Medical College, Chicago.
Chicago Medical College, Chicago.
Woman's Medical College, Chicago.
College of Physicians and Surgeons, Chicago.

INDIANA.

Medical College of Indiana, Indianapolis.
Central College of Physicians and Surgeons, Indianapolis.
Fort Wayne College of Medicine, Fort Wayne.

IOWA.

- Medical Department University of Iowa, Iowa City.
- Keokuk Medical College, Keokuk.
- The College of Physicians and Surgeons, Keokuk.

KANSAS.

- Kansas Medical College, Topeka.
- Wichita Medical College, Wichita.

KENTUCKY.

- Hospital College of Medicine, (Central University of Kentucky,) Louisville.
- Medical Department University of Louisville, Louisville.
- Kentucky School of Medicine.

LOUISIANA.

- *Medical Department Tulane University, New Orleans.

MARYLAND.

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

MASSACHUSETTS.

- Harvard University Medical College, Boston.

MICHIGAN.

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

MINNESOTA.

- Medical Department University of Minnesota, Minneapolis.
- College of Physicians and Surgeons, Minneapolis.

MISSOURI.

- Missouri Medical College, St. Louis.
- Saint Louis Medical College, St. Louis.
- Beaumont Hospital Medical College, St. Louis.
- Marion Simms Medical College, St. Louis.
- St. Louis College Physicians and Surgeons, St. Louis.
- Ensworth Medical College, St. Joseph.
- North-Western Medical College, St. Joseph.

NEBRASKA.

- Omaha Medical College, Omaha.

NEW YORK.

- Albany Medical College, Albany.
- College of Medicine Syracuse University, Syracuse.
- Medical Department Niagara University, Buffalo.

OHIO.

- Medical Department Western Reserve, Cleveland.
- Medical College of Ohio, Cincinnati.
- Starling Medical College, Columbus.
- Cincinnati College of Medicine and Surgery, Cincinnati.
- Miami Medical College, Cincinnati.
- Medical Department University of Wooster, Cleveland.
- Columbus Medical College, Columbus.

PENNSYLVANIA.

- University of Pennsylvania Department of Medicine, Philadelphia.
- Medico-Chirurgical College, Philadelphia.
- Woman's Medical College, Philadelphia.
- Western Pennsylvania Medical College, Pittsburg.

TENNESSEE.

- Medical Department University of Nashville, Nashville.
- Tennessee Medical College, Knoxville.
- Chattanooga Medical College, Chattanooga.
- *Nashville Medical College, (Medical Department University of Tennessee,) Nashville.
- Medical Department Central Tennessee College, Nashville.
- Memphis Hospital Medical College, Memphis.

Total, - - - - - 66.

TREASURER'S REPORT.

CASH ACCOUNT.

DR.	CR.
1890. Received Dues\$110 00	1890. Exp. printing\$ 7 00
1891. " 115 00	Record book 2 00
1892. " to Aug.1. 120 00	Stationery..... 9 00
Total.....\$345 00	Stenographer..... 10 00
	Postage (estimate).... 4 00
	1891. Certificate of membership and seal..... 44 00
	Clerk hire..... 10 00
	Postage..... 4 00
	1892. Postage 4 00
	Clerk hire..... 10 00
	Incidental 3 25
	\$107 25
	Bal. due Ass'n Aug. 1, 238 75
	\$345 00

*Resigned membership.

CONSTITUTION.

Adopted

1897

ARTICLE I.

This Association shall be known as the **ASSOCIATION OF AMERICAN MEDICAL COLLEGES.**

ARTICLE II.

SECTION 1. Colleges adopting and observing the rules of this Association, as herein provided, shall be eligible to membership. Each college shall be entitled to one representative at all the meetings of the Association.

SEC. 2. Colleges desiring membership in this Association, shall make written application to the Secretary, officially signed, and pay to the Treasurer of this Association the sum of five dollars (\$5), annually, in advance.

ARTICLE III.

SECTION 1. Members of this Association shall require of all matriculates an English composition, in the handwriting of the applicant, of not less than two hundred words, an examination by a Committee of the Faculty, or other lawfully constituted Board of Examiners, in higher arithmetic, algebra, elementary physics and Latin prose.

SEC. 2. Graduates or matriculates of reputable colleges or high schools of the first grade, or normal schools established by State authority, or those who may have successfully passed the entrance examination provided by the statutes of the State of New York, may be exempted from the requirements enumerated in Section 1.

SEC. 3. Students conditioned in one or more of the branches enumerated as requirements for matriculation, shall have time until the beginning of the second year to make up such deficiencies; provided, however, that students who fail in any of the required branches in this second examination shall not be admitted to a second course.

SEC. 4. Colleges granting final examination on elementary subjects to junior students, shall not issue certificates of such final examination, nor shall any member of this Association confer the degree of Doctor of Medicine upon any person who has not been first examined upon all the branches of the curriculum by the faculty of the college granting the degree.

SEC. 5. Candidates for the degree of Doctor of Medicine shall have attended three courses of graded instruction of not less than six months each, in three separate years.

SEC. 6. Students who have matriculated in any regular college prior to July 1st, 1892, shall be exempted from these requirements.

ARTICLE IV.

SECTION 1. The officers of this Association shall be a President, Senior and Junior Vice-Presidents, Secretary and Treasurer, and a Judicial Council of seven members: all of whom shall be elected annually by ballot and serve until the election of their successors.

SEC. 2. The President, or one of the Vice-Presidents in his absence, shall preside at all the meetings and perform such duties as parliamentary usage in deliberative assemblies and the By-Laws of this Association may require. Of the seven members constituting the Judicial Council, the three whose names appear first on the list of those first elected shall serve three years. Of the remaining four, the two first named shall serve two years, and the two last named shall serve for one year. Vacancies by expiration of term to be filled at the annual election of officers. Vacancies

by death or resignation may, if business of importance arise, be filled by the surviving members in the interval between the annual meetings of the Association.

SEC. 3. The Secretary and Treasurer shall record the proceedings of the meetings, conduct the correspondence, receive dues and assessments from members, disburse the funds of the Association as provided by resolution, issue certificates of membership, and perform such other duties as the By-Laws may require.

SEC. 4. The Judicial Council shall investigate and determine all questions of violation of the rules and regulations of this Association, and all matters of dispute between the members of this Association. All charges or complaints shall be preferred formally in writing, and referred to the Council. The Council shall make written report at the next ensuing session of the Association, upon all matters received for adjudication.

ARTICLE V.

SECTION 1. The stated meetings of this Association shall occur annually on the day next succeeding that designated for the annual assembling of the American Medical Association.

SEC. 2. A majority of the members shall constitute a quorum.

ARTICLE VI.

This Constitution shall not be altered or amended, except by written notice to all the members, at least thirty days' previous to a stated meeting, and by a vote of two-thirds of all the delegates present at such meeting.

BY-LAWS.

SECTION 1. The presiding officer shall, on calling meetings to order, call for the reading of the minutes of the previous session, which, when approved, shall be recorded in a book kept for that purpose, signed officially by the Secretary and approved by the President.

SEC. 2. After approval of the minutes, the Secretary shall announce the Colleges represented at the meeting, and an adjournment of ten minutes shall then follow, to allow other representatives present to register and pay their dues.

SEC. 3. Order of business:

1. The reading of the minutes of the previous meeting.
2. Roll call of membership.
3. Reports of Committees.
4. Secretary and Treasurer's report.
5. Report of Judicial Council.
6. Papers and essays.
7. New business.
8. Adjournment.

SEC. 4. These By-Laws may be altered or amended at any time by unanimous consent of the members present, or by written proposition, to so alter or amend, being read in open session and receiving the approval of a three-fourths vote of all the members present at an adjourned session of any stated meeting; provided, however, no more than twenty-four hours shall have elapsed between the time of the proposition to amend and the final vote thereon.

The following papers were read and discussed at the last annual session:

*To What Extent Should Clinical Instruction be Afforded
Students of Medicine in Regular Course.*

By N. S. DAVIS, M. D., LL. D., Dean of Northwestern University Medical School,
(Chicago Medical College,) Chicago, Ill.

The subject of Clinical Instruction, as a part of the regular medical training required for the student during his attendance on his college courses, is one of much importance, and should receive more attention than has been hitherto given it. That the student should receive sufficient true clinical training to make him familiar with the means and methods of the examination of patients, the diagnostic symptoms of diseases, and the application of remedies, before being authorized to commence the practice of medicine and surgery, is generally admitted.

Whether such clinical training should take place while the student is actively engaged in prosecuting his medical college studies, or should be assigned to one or two years after he has completed the college curriculum, is a question concerning which much might be said. If the student is required to have a good general education and a fair degree of mental discipline before he commences the study of medicine, four years is certainly as long a period as three-fourths of the students can afford to spend in strictly professional study before they commence practice. Admitting this to be true, I think both reason and experience show that the first of the four years should be devoted exclusively to the study of anatomy, physiology, chemistry and materia medica with abundant practical work in the anatomical, histological, physiological and chemical laboratories with no clinics. But having thus gained at least an outline knowledge of the human body and its functions in health, and some knowledge of medicines, the student is fairly prepared to profit by one or two hours of direct clinical instruction each day during his second, third and fourth annual college courses. Such clinical instruction, however, should not be given to large classes in college and hospital amphitheatres or crowded wards, as is too generally done; but it should be so graded as to permit of adjustment to the need of each year's class, corresponding with the grading of the several branches of the curriculum. For example, the first year of clinical instruction, which would correspond with the second year of medical study, should

aim to make the student personally familiar with the physiognomy and symptomatology of diseases, and with the use of all instruments and appliances for accuracy of examination and diagnosis, both medical and surgical. The second clinical year should be chiefly occupied in the study of the actual pathological processes taking place in the different forms of disease and their relation to the symptoms, including personal examinations, chemical and microscopic, of the secretions and excretions in the several stages of progress of disease, as well as the tissue changes to be found after death. With these studies, the objects to be accomplished for counteracting the morbid processes, correcting the secretions, and preventing permanent or fatal tissue changes, should be clearly indicated. Having thus become clinically familiar with the symptoms, diagnosis and pathology of diseases and the indications desirable to fulfill in their management, the third clinical year should be devoted directly to the study of methods and means of treatment, preventive, hygienic, thereapeutic and surgical.

The advantages to be gained by such grading of clinical studies as I have just indicated must be obvious to both the student and the clinical teacher: 1st. By giving to each year of clinical study, limited and definite objects, the accomplishment of which makes his next year's work easier and more thorough, you not only make the student's practical knowledge more systematic and comprehensive, but you add much to his mental discipline and accuracy of observation. 2nd. Such a system necessarily limits the number of students in any one clinical class, and in the same ratio increases the opportunities and value of individual training, which is the most essential feature of all true clinical study. The dispensaries and hospitals of our larger cities in which the medical schools are chiefly located, contain an abundance of clinical material, that needs only judicious arrangement and faithful attention to secure both the most complete clinical instruction and the most skillful service for the sick. But as the subject is to be before you for further discussion, I will not occupy your time with details at present. The principle or system of grading the clinical instruction of students during their consecutive courses of medical college attendance, will be found no less important and advantageous than is the proper grading of the various branches of medicine contained in the college curriculum.

*The Kind and Amount of Laboratory Work Which Should be
Required in Our Medical Schools.*

By VICTOR C. VAUGHAN, A.M., M.D., Dean Medical Dept. University of Michigan.

Mr. President and Gentlemen:

It will not be necessary for me to take any time in giving the arguments in favor of teaching medical students by the laboratory method many of the sciences which must enter into the curriculum of study. I will take it for granted that all reputable teachers of medicine understand that analytical chemistry, practical anatomy, bacteriology, histology, physiology, analysis of urine, pathology, etc., must be taught in the laboratory in part at least, if taught at all. How can you expect the practitioner to tell whether a given bit of tissue is from a malignant growth or not, when he has never seen a cancer cell? How could he be trusted with such an examination when he has never used a microscope, cut a section, or made a microscopical mount? How can the young practitioner diagnose tuberculosis in its early stages, when he has had no practical experience in staining germs and when he would not recognize the bacillus tuberculosis should it be placed before him? How can he detect tyrosine or leucine in the urine, when he does not know a crystal from an air-bubble? How can he recognize structural disease of the kidney when he does not know a cast from an epithelial cell? These questions suggest their own answers. It might be said, possibly, that many of the older men now practicing medicine and doing so satisfactorily, and, indeed, with credit to themselves and to the profession, never had laboratory instruction in these branches. This is true, but these men have been compelled to take up these new studies and methods for themselves. Besides, more is expected in these directions from the recent graduate than from the older man. Medical schools should always give the best and the most recent information, and every fact which may possibly aid in the diagnosis or treatment of disease should be made known to the student. The student has the right to expect and to demand this of teachers, and all intelligent and conscientious students will do so. The time once was when the teacher was a model from which his students copied. The student measured his own success by the extent to which he imitated his master. Now, that teacher who does not give his student opportunities for independent and original work in science is to a large extent a failure. Just as in the general progress of the race, one generation should be wiser than the preceding, so every class

should contain one or more students who will at maturity be wiser than the best teacher.

I will presume that all of us here agree that laboratory instruction should be given in medical schools, and with this presumption I will now turn to the question of what, in kind and amount, should this laboratory teaching consist.

We will suppose that the student has had a full course in a good high school or an equivalent of this. (The best medical colleges are not satisfied with a less requirement for admission.) The student is able to use the English language correctly, and he has a good drill in mathematics, including arithmetic, algebra and plain geometry. He has had, we will suppose, fair instruction in systematic botany and zoology. He is acquainted with the general classification of plants and animals, and knows the meaning of the general terms employed in the natural sciences. He has some knowledge of physics, knows what is meant by the conservation of energy, and understands the fundamental principles underlying our knowledge of heat, light and electricity. I am aware of the fact that many medical schools admit students who have not these qualifications, but such a school does not comply with the rules of this association, and I am to discuss the question of laboratory teaching in those colleges which belong to this association and which live up to the requirements to which we have mutually and voluntarily pledged ourselves.

In the first place it will be convenient to specify what I mean when I speak of the number of hours, days or weeks given to a subject. We will suppose that there are five teaching days in the week, that the forenoon of these days are devoted to class instruction given in the form of lectures and recitations, and that four hours of each afternoon are spent in laboratory work. In certain schools this order may be reversed or some of the laboratory instructions, practical anatomy for instance, may be given in the evening. With the understanding then that four hours shall constitute a day of laboratory work, I will outline such a course as I conceive to be essential to the student.

The courses of laboratory work which should be embraced in the medical curriculum are, (1) analytical chemistry, (2) practical anatomy, (3) bacteriology, (4) physiological chemistry, including the analysis of urine, (5) histology, (6) physiology, and (7) pathology.

(1) *Analytical Chemistry.* The medical student should become acquainted with the physical properties, solubilities and general reactions of the salts of silver, lead, mercury, copper, arsenic, anti-

mony, bismuth, iron, zinc, cobalt, nickel, barium, calcium, potassium, sodium, lithium and ammonium, which are employed in medicine. This knowledge cannot be properly acquired from a study of books alone.

The student must see these compounds, must dissolve them, and must ascertain their incompatibles by precipitating the bases and acids with various reagents. To do this properly, experience has shown that a course of twelve weeks is required. If a shorter time is given to this branch the work must be done superficially and the knowledge is but imperfectly acquired.

(2) *Practical Anatomy.* Each student should first have a thorough drill in osteology. With the bones before him he must study their size and shape, the nature of their articulations, the points of origin and insertion of ligaments, tendons and muscles and the location of foramina. Then he should carefully, slowly, intelligently, under the eye of a demonstrator, dissect every part of the body, and in doing so he must not only study the position, size and physiological office of each muscle, but of the viscera, the blood vessels and nerves. My observation has led me to believe that too often dissection means nothing more than a study of myology.

If the student is to become a surgeon it is quite as important that he should know what blood vessels and nerves are to be severed in a given operation as to know what muscles he must traverse with his knife. If he becomes a general practitioner he will need to recall the anatomy of the viscera more frequently than that of the muscles. Every medical school should also offer a course in surgical anatomy. Of course the professor of anatomy dissects before the class and gives especial attention to the hernial region and other parts of the body upon which surgical operations are often necessary; but this is not enough. Such knowledge as this is what our legal friends would designate as hearsay. The positive knowledge can be gained only by the student using the knife himself. Knowledge thus gained becomes a part of himself and arms him with a consciousness of his own resources when he is called upon to do the operation for the first time upon the living body.

The osteology should be taught during the first part of the first year. Then the courses in dissection may follow, while that in surgical anatomy is of most benefit when given later in the course and at times when the student is in attendance upon the surgical clinics.

I think that twenty weeks' time is none too long for the osteology and the dissections, while four weeks more might be given to the operative work.

(3) *Bacteriology*. Practical bacteriology is taught as an undergraduate course in only a very few medical schools, but this is not as it should be. The germ theory is now, and has been for some years, much more than a theory, and the casual relation of certain bacteria to certain infectious diseases has been demonstrated with all the certainty of direct scientific experimentation. We all teach that tuberculosis, diphtheria, typhoid fever, etc., are caused by bacteria; that the detection of these bacteria in many cases offers the only early means of positive diagnosis, and yet only a very few colleges afford any demonstrative instruction in this branch. Every sanitarian speaks of the spread of typhoid fever by contaminated drinking-water, and still of the hundreds of medical students graduated in this country within the past three months only a very small number have any conception of the method of procedure necessary to detect the typhoid germ. The surgeon dwells upon the fact that the pyogenic germs give rise to suppuration, and seldom demonstrates these organisms to his students. Great stress is placed upon the necessity of examining the sputum in suspected tuberculosis, and yet hundreds of graduates of the present year would not know how to stain the germ nor would they recognize it were it stained and placed before them. We teach that in many cases the recognition of Löffler bacillus is the only sure means of the positive recognition of diphtheria, and yet how many teachers make their students acquainted with the practical means of recognizing this organism. There is just cause of complaint on this point. Schools which neglect this branch of instruction are not giving their graduates the proper equipment.

A course of bacteriology embraces the methods of the preparation of the various culture media, of the processes of obtaining pure cultures, of the nature of growths on the various media, of the effect of pathogenic germs on animals, and of the detection and identification of the germs in tissue, in sputa, in drinking-water, and elsewhere. Such a course should begin with the study of the non-pathogenic and proceed to that of the pathogenic bacteria. I have tried the teaching of bacteriology in all the classes of a four years' course, and find that I can teach this subject to the students of the first year as satisfactorily as to those of the fourth year. Indeed, there is an advantage in having this instruction given early in the course. The student who has studied the diphtheria bacillus, or that of a tuberculosis, in the laboratory, and knows the

manner of their growth, and has watched their effects upon animals, will listen to his clinical lectures upon these diseases with greater interest and more intelligence than the student whose only knowledge of these organisms is confined to that of their names with some imperfectly understood text-book or lecture description of them. Ten or twelve weeks should be given to the course.

(4) *Physiological Chemistry.* This course should embrace a chemical study of the most important secretions of the body. The tests for hydrochloric and lactic acids in vomited matters, the recognition of the digestive ferments and the method of the determination of the activity of the same, and an analysis of the urine and bile, should be included. The student should be made perfectly familiar with the constituents of normal urine. In most medical schools the analysis of urine is limited to the detection of sugar, albumen and bile. Students with such training often mistake epithelial scales for casts, and pronounce every reducing substance found in the urine, sugar. I meet with mistakes of this kind frequently, and have known more than one physician to lose the confidence and respect of the patient and his friends by mistaking an epithelial scale for a cast. A physician is often pardoned for overlooking a serious trouble when it exists, but it is a sad mistake to tell some man that he has an incurable form of Bright's disease or diabetes, when nothing of the kind exists. The patient gets over his fright after a while, but he is not likely to forgive the doctor who has made the blunder.

I believe that analysis of urine should form a part of clinical instruction, but this work should be preceded by a scientific study of normal urine and the scientific methods of estimating the most important normal and abnormal constituents of the urine. The course in physiological chemistry will occupy not less than ten or twelve weeks.

(5) *Histology.* The medical man certainly must be able to recognize the various tissues of the body by their microscopical appearance. He must be acquainted with the methods of hardening specimens, making sections, mounting and staining the same. This knowledge can not be acquired from books or in the lecture room. Laboratory instruction in this branch is a necessity. This knowledge can be gained in a course of six weeks.

(6) *Physiology.* All medical teachers admit the necessity of practical dissection in acquiring anatomical knowledge, while but few schools give practical courses in physiology. Notwithstanding this, it is certainly true that the medical man needs to employ his physiological knowledge quite as often as he does his anatomical

learning. When such instruction is properly given we will have much more intelligence displayed in the practice of medicine. One needs to know the anatomy of the heart in order to detect valvular diseases of that organ, but the number of functional diseases of the heart which one is called upon to treat is certainly greater than that of structural diseases of the same organ, and yet the student in most of our schools has no practical instruction in the innervation of the circulating system. How many of us were able from knowledge gained in our undergraduate course to intelligently apply electricity to any part of the body, to mark out anæsthetic areas which would result from injury to or disease of any nerve, to intelligently interpret the reaction obtained in testing the knee reflex, to properly ascertain the degree of sensation in any muscle, to explain the relation between injury to the floor of the fourth ventricle and the glycogenic function of the liver; or in short, did we have any positive physiological knowledge other than a general idea of the processes of digestion, absorption and elimination? Do we not feel the want of this training in the work of every day? Should we not see to it that our students have this instruction? A six weeks' course in laboratory physiology will in my opinion be of great service.

(7) *Pathology.* The necessity of practical instruction in this branch will be admitted by all. Such a course should embrace both gross and minute pathology. The bungling way in which post-mortem examinations are often performed, and the little information which the medical man usually gets from such an examination, afford abundant evidence of the fact that gross pathology is too much neglected in our schools. Without microscopical pathology the determination of the nature of many growths is quite impossible. Let us give six weeks to the dead-room and laboratory courses in pathology.

To sum up I would say that the following laboratory courses are essential:

- (1) Analytical chemistry, 12 weeks.
- (2) Practical and surgical anatomy, 24 weeks.
- (3) Bacteriology, 10 to 12 weeks.
- (4) Physiological chemistry, 10 to 12 weeks.
- (5) Histology, 6 weeks.
- (6) Physiology, 6 weeks.
- (7) Pathology, 6 weeks.

This makes a minimum of 74 weeks. The greater part of this work should precede clinical instruction. Besides the above mentioned courses, therapeutics, including electro-therapeutics, is now

being taught in some schools largely by laboratory methods, and this tendency will grow.

Laboratory methods will soon largely modify clinical teaching. Amphitheatre clinics are giving way to bed-side and section instruction. Laparotomies and other capital operations are now made by the students in some of our schools on dogs. The surgeon as well as the chemist has his laboratory. The student delivers the alcohol baby from the rubber mother before he is permitted to enter the lying-in room. It is no longer necessary to spoil a hatful of human eyes before one becomes a skillful ophthalmologist.

*Discussion of Prof. Vaughn's Paper by Bayard Holmes, B.S.,
M.D., Secretary College of Physicians and Surgeons,
Chicago, Ill.*

Mr. President and Gentlemen of the Association of Medical Colleges:

The paper of Dr. Vaughn which has interested us so much suggests great changes in medical education. During the past year my attention has been called to some of the details of laboratory work which must be faced by every one of you. Allow me to very briefly speak of some of the results of my thoughts and studies.

Laboratory rooms must be light and roomy. Forty square feet of floor is the least amount which will accomodate a single student, and then only in the chemical laboratory. In all other laboratories at least sixty square feet of floor space not including aisles must be allowed each student. In the chemical laboratory students' desks may be placed twenty feet from the windows; in laboratories in which microscopes are to be used, fourteen feet is a maximum.

The ordinary medical class in the larger institutions ranges from one hundred down to thirty, and therefore the laboratory room should be, if lighted on both sides, not less than fifty by forty feet, and it may be lengthened but not widened. At the institution which I represent, our laboratory rooms were last winter twenty-five feet by sixty feet, lighted on one side and both ends; our largest class numbered ninety-four, and it was necessary, therefore, except in chemistry and bacteriology, to divide the class

into two sections and then crowd them. Our new laboratories are attached directly to the old ones and are the same width, (25 feet) making each laboratory a room one hundred and sixty feet long, lighted on one side and capable of accomodating eight students to each ten feet of length. This gives us, besides the necessary reduction for aisles and preparation rooms, accomodations for one hundred and twenty students in each laboratory. This seems like a large class for laboratory work. So it is. And yet the fact that our laboratory teachers are practicing physicians makes it necessary to economize their time. They are unable to give the work the whole day, or every day in the week, and we believe, supposing an unlimited supply, that brick, stone, glass and iron are cheaper than men. This large laboratory class necessitates great and even elaborate system and unusually efficient teachers. Every man who can conduct a laboratory exercise creditably with a class of ten, will not be able to hold and instruct a class of seventy-five.

The order necessary requires such an arrangement of desks as will allow two sets of men to use each laboratory room. Our desks in the three microscopical rooms have a flat surface $1\frac{1}{2}$ by $3\frac{1}{2}$ feet, of oiled white wood. There is a knee space two feet nearly and two cupboards on the right, each locking with a Yale lock, and each eighteen inches square and two feet deep, in which are suitable drawers and shelves. The desks are built in pairs and the sides are stained white wood. Stools are provided that are about two inches higher than the ordinary chair and can be placed in the knee space when not in use.

These details may be tiresome, but success in the laboratory work depends on the care with which these details are considered. One of the most important matters is the system of bookkeeping employed by the curator in keeping track of the supplies. We lost at least two thousand dollars unnecessarily from the neglect of this businesslike forethought. Last term we started out with a single man for curator. The demonstrators furnished lists of material required for each of the nine laboratory courses which were conducted last term. A sufficient number of outfits were made up by the curator a month before the term opened. On an appointed hour the students selected their desks in the laboratory in the order in which they purchased their tickets. They went one by one to the store-room as their places were assigned and received each his outfit. In the outfit were two printed lists of the material contained. Each student compared his invoice with the outfit, signed the receipt on one invoice, left it with the curator, and

after locking the desk put his key in his pocket and went out in an orderly manner. These receipted invoices were entered in a book which had two columns opposite each student's name, one for debits, one for credits, and a place for the student to sign his name on receiving his balance and closing the account. Students are encouraged to keep their outfits, as they are useful in promoting after study. They are paid for at cost, or a little above cost, out of a deposit fund placed with the treasurer for that purpose. By such a system the laboratories may be made a source of income, and not an expense to the college.

The equipment and supplies are purchased for the most part in Europe, on account of the enormous reduction which the law allows educational institutions in the rebate in imposts. It is necessary to put in all orders for European goods at least as early as March first. In our laboratories we are using the Leitz microscopes. We have now a sufficient number to give each two men an instrument. We urge students to provide themselves with microscopes, and many of them do, especially the second year.

If I may be allowed the time, I should like to show you some drawings made last winter by second year men in the College of Physicians and Surgeons in the laboratory of Dr. A. P. Ohlmacher, Professor of Embryology and Biology. These two hundred and fifty or more drawings represent the work of *everyone* of the class of seventy-two students, and they were a part of the final examinations on that branch. Under the directions of Prof. Ohlmacher and his two assistants, Mr. Stoltz and Mr. Osincup, selected out of the class, each student opened his incubated egg, sketched and removed his embryo, fixed, stained, imbedded, cut and mounted it. He made drawings representing the different portions, and was quizzed on the drawings and the specimens under the microscope.

You will notice that in spite of the fact that there is a general impression among students that some can not draw, there is not one disgraceful drawing in the lot, and there are at least two or three drawings from each student in a class of seventy-two. The class only studied the first four days of the embryo's development, so you will recognize all the parts.

Let me call your attention especially to the drawing of the whole embryo by Mr. Stoltz. Each student made a sketch like this, but Mr. Stoltz in examining a large number of eggs found one with an error of development which he has described in full in the *Scalpel*, the magazine published by the students of the College of Physicians and Surgeons of Chicago. Both drawings are

reproduced here to show the best free-hand drawing without the use of a camera lucida or other projection device.

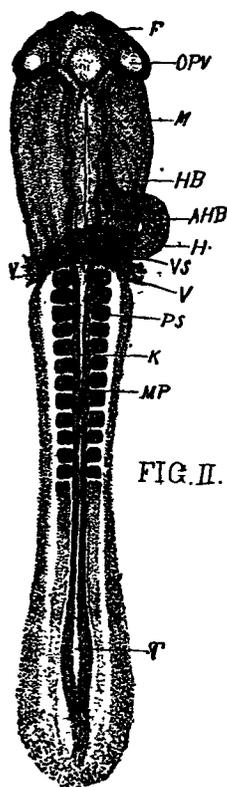


FIG. II.

The Normal Embryo.

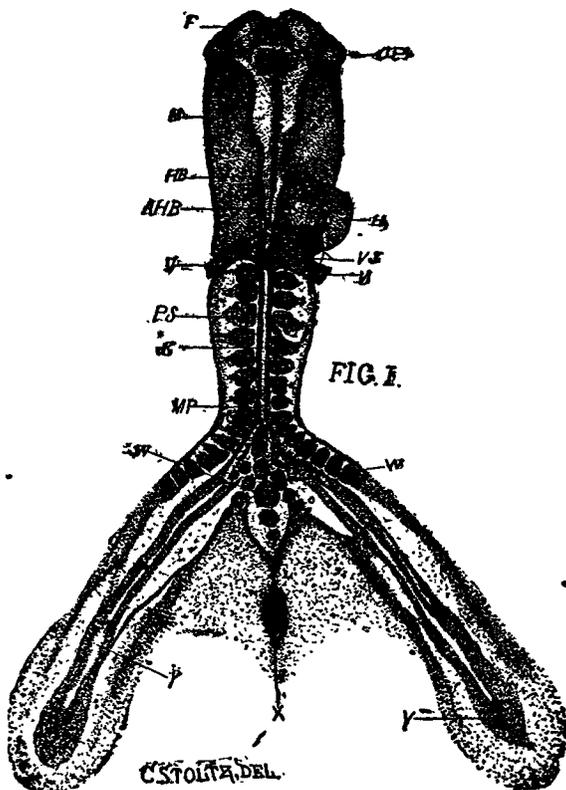


FIG. I.

The Fissioned Embryo.

Perhaps the only original departure made by the College of Physicians and Surgeons during the past year has been in the introduction of an extended course in Biology. This course really covers a course in comparative anatomy, a course in elementary physiology, and a course in the histological study of the elements of mammalian structure. As a whole, the course occupies twelve hours a week, and has been most successfully conducted by Prof. Ohlmacher. If it will not tire you too much, allow me to show you some three hundred drawings made during the present spring term by a class of twenty-two men who have just begun the study. The complete work of each man, as far as has been required, is before you. You will notice a greater difference in the mechanical execution here than in the embryology. The drawings in all the laboratories are made on paper furnished at cost by the College. It is of uniform

size, 11 by 8½ inches, or 8½ by 5½ inches. The drawings occupy a definite portion of the sheet, leaving a margin of one inch all around, and a quarter of an inch more on the left hand end for binding. It is impossible to show this work on the printed page, but a few drawings will be reproduced by the photographic process, much reduced, in hopes to give a faint idea of the work. Some of the best drawings are in colors and can not be reproduced at all, others are too fine to stand reduction, and others have some shading which would require too expensive a method of reproduction.

Dr. Vaughn has given me one idea which is new, and that is of the position of bacteriology in the course. This branch has been placed in our school in the third year, on account of its intimate connection with medicine and surgery, which fills the fourth year. There seems no reason why it should not appear earlier in the course. Systematic bacteriology could certainly be placed in the second year. Still I believe that its value to the student would be increased by associating it with pathological study as we have done.

In regard to the length of laboratory hours, several points must be considered. Microscopical laboratories can not conflict because we do not have enough microscopes to equip two laboratories at once. Our men can not spare more than three hours at a time out of their practice, and therefore it has been found necessary with us to make the length of each laboratory exercise two hours. There is no doubt that, had we the entire time of our laboratory teachers at our disposal, it would be better to make the unit of the laboratory exercise three or four hours as the essayist has suggested.

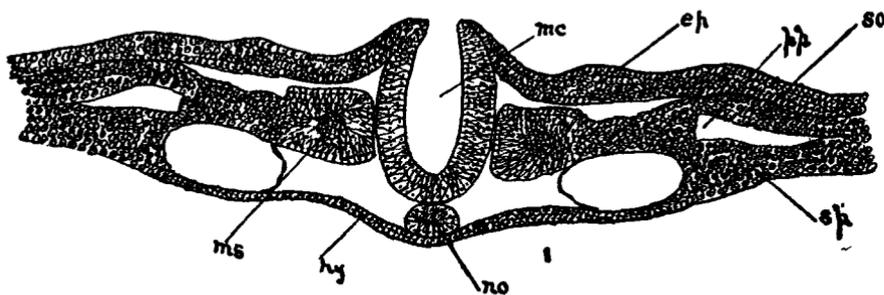
On account of the necessity of one laboratory exercise following another without intermission, and on account of the necessity of some preparation in each laboratory room before each exercise, we have concluded that it is necessary to provide *at least* two microscopical laboratories. This we have done, and you will see by the time card how our exercises follow one another, and what portion of the student's time in each year's work is occupied in lectures and recitations, in laboratory work and in clinics.

The introduction of laboratory work gives a new impetus to medical education in small cities. The work in this department can be done better, other things equal, in small medical schools. I predict that these medical schools in small cities that adopt vigorous methods of laboratory teaching will rise to a prominence they could never have attained while medicine was taught by lectures and clinics alone.

The laboratory teaching will also make a change in the character of medical students. The farmer or butcher medical student can not hold his knees fifteen or twenty hours a week under the laboratory table throughout a four-year course. He will give place to the educated young men of twenty, graduated now in such astounding numbers from the multiplying colleges all over the country, but especially the Central States. It should be our aim to secure these men if we would have our efforts in medical education succeed.

Again, in order to have our laboratory work done in a constantly efficient manner, it must be done by the same men for a long time. This requires money, and more money than any but the largest schools can obtain from students. That is to say, laboratory work calls for endowment. Only a few State Universities pretend to support medical schools, and so far as I know only one of these, Minnesota, contributes liberally to the annual expenses of the medical department. It seems strange that the department of the university, which should in this country furnish one-fourth of the entire enrollment, should not have received even two per cent of the endowment. It should be the concerted effort of this Association to educate the generous public to a thorough understanding of our deserts and our needs.

The following figures, numbered 1, 2, 3, 4, 5 and 6, represent reproductions of embryological drawings by several of the students in the class. They are all drawings of cross sections of embryo chicks of various stages of development. These drawings were made on the paper described in India ink, being copies of the classroom drawings which were first made in a note book with lead



pencil. No text book was used in the work of embryology, the work being guided by a few printed syllabi and by oral instruction. Hence the student had no illustration of the object he studied, save the picture his mind conceived. We may, therefore, take these drawings as representing the student's individual conception.

TIME CARD FOR WINTER COURSE OF 1891-92.

THE COLLEGE OF PHYSICIANS AND SURGEONS,

813 W. HARRISON STREET, CHICAGO, ILL.

FIRST YEAR COURSE.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
1 to 3 P. M.	Pharmacological Laboratory CALDWELL	Chemical Laboratory WESNER	Histological Laboratory HARDIE	Chemical Laboratory WESNER	Histological Laboratory HARDIE	Chemical Laboratory WESNER
3 to 4 P. M.	Physiology BUCKMASTER	Materia Medica CALDWELL	Histology HARDIE	Materia Medica CALDWELL	Physiology BUCKMASTER	Materia Medica CALDWELL
4 to 5 P. M.	Anatomy RUTHERFORD	Physiology HENSON	Anatomy RUTHERFORD	Physiology HENSON	Anatomy RUTHERFORD	Physiology HENSON
5 to 6 P. M.	Chemistry J. A. LYDSTON	Anatomy MITCHELL	Chemistry J. A. LYDSTON	Anatomy RUTHERFORD	Chemistry J. A. LYDSTON	Anatomy MITCHELL
7 to 9 P. M.	Anatomical Laboratory, Dissections and Demonstrations.					

SECOND YEAR COURSE.

8 to 9 A. M.	Pathology HEKTOEN	<i>Antropics</i> HEKTOEN	Surgical Anatomy E. E. BARCOCK	Dental Surgery HARLAN	Therapeutics J. H. CURTIS	Surgical Anatomy E. E. BARCOCK
9 to 10 A. M.	Pathology	Therapeutics J. H. CURTIS	Eye and Ear BETTMAN	Surgical Pathology VAN HOOK	Medical Jurisprudence BURROWS	<i>Genito-Urinary</i> G. F. LYDSTON
10 to 11 A. M.	CARTER	Genito-Urinary and Venereal G. F. LYDSTON	<i>Orthopedic Surgery*</i> HOADLEY	Genito-Urinary and Venereal G. F. LYDSTON	Nose and Throat WAXHAM	Diseases of Children WAXHAM
11 to 12 A. M.	Quiz* DAVIS	Bacteriology HOLMES	Operative Surgery* PALMER	Nervous System* KING	Obstetrics NEWMAN	<i>Nervous System*</i> KING
1 to 1 P. M.	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>
2 to 4 P. M.	Pathological Laboratory EVANS	Surgical Pathological Laboratory VAN HOOK	Bacteriological Laboratory HOLMES	Pathological Laboratory EVANS	Surgical Pathological Laboratory VAN HOOK	Embryology Laboratory NEWMAN
7 to 9 P. M.	Anatomical Laboratory, Dissections and Demonstrations.					

* These are Third Year studies.

HARSHA quizzes* Tuesday, 11 to 12.

THIRD YEAR COURSE.

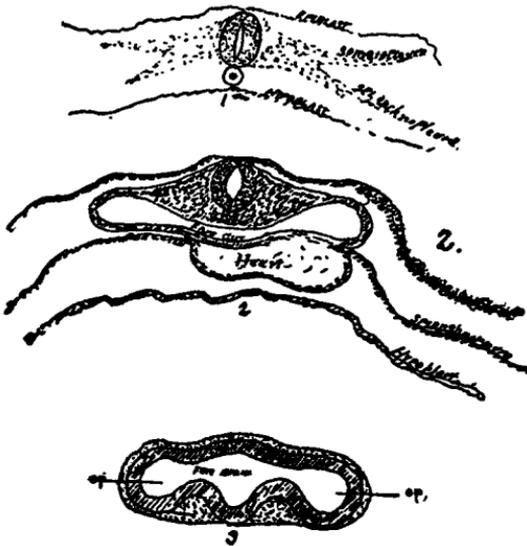
1 to 2 P. M.	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>	<i>Dispensary Clinics</i>
2 to 3 P. M.	<i>Surgical Clinic</i> STEELE	<i>Medical Clinic County Hospital</i>	<i>Surgical Clinic</i> PALMER	Chest R. H. BARCOCK	<i>Medical Clinic County Hospital</i>	Chest H. B. BARCOCK
3 to 4 P. M.	Gynecology JACKSON	<i>Surgical Clinic County Hospital</i>		<i>Gynecological Clinic</i> JACKSON	<i>Surgical Clinic County Hospital</i>	
4 to 5 P. M.	Medicine QUINE	Medicine QUINE	<i>Medical Clinic</i> QUINE	Medicine QUINE	Medicine QUINE	<i>Surgical Clinic</i> FENGER
5 to 6 P. M.	Surgery FENGER	Obstetrics EARLE	Surgery HOLMES	Surgery STEELE	Surgery STEELE	

QUIZ CLASSES.

7:30 P. M.	SIPPEY	BUCKMASTER	MILLER	NEWMAN	MILLER	BUCKMASTER
8:30 P. M.	MITCHELL	GREENFIELD	J. A. LYDSTON	HALSTED	J. A. LYDSTON	HEKTOEN

The lettering of the various parts is made uniform only for the sake of easy comparison.

Fig. 1 was drawn by Mr. J. F. Adams from a section of the tail end of a 36-hours chick. It shows very clearly the primitive germinal layers, splitting of the mesoblast, mesoblastic somites, notochord



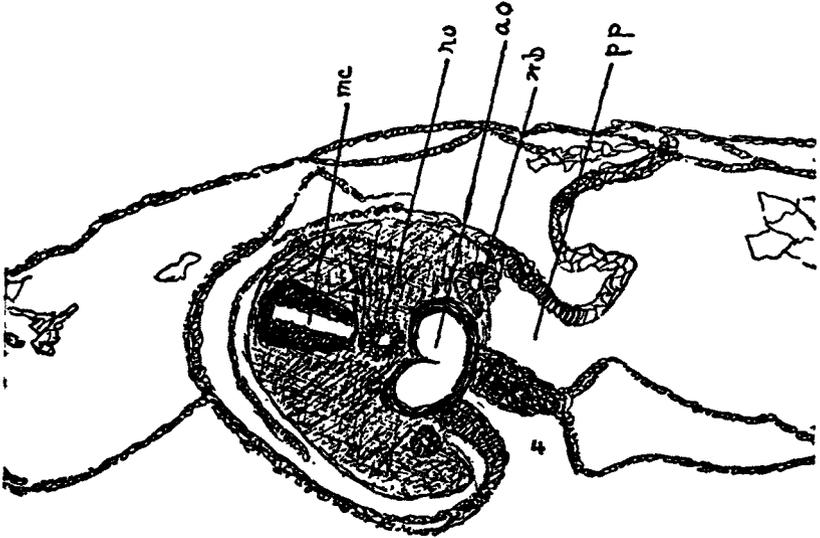
and medullary canal not completely closed. Fig. 2 represents three drawings by Mr. O. B. Monosmith, showing a section through the tail end, one through the heart region and one through the fore brain of a 36-hours chick, all from the same embryo. Fig. 3 from an embryo of about 50-hours incubation, by A. M. Fulton. Fig. 4 shows the amniotic folds and amniotic cavity very clearly,



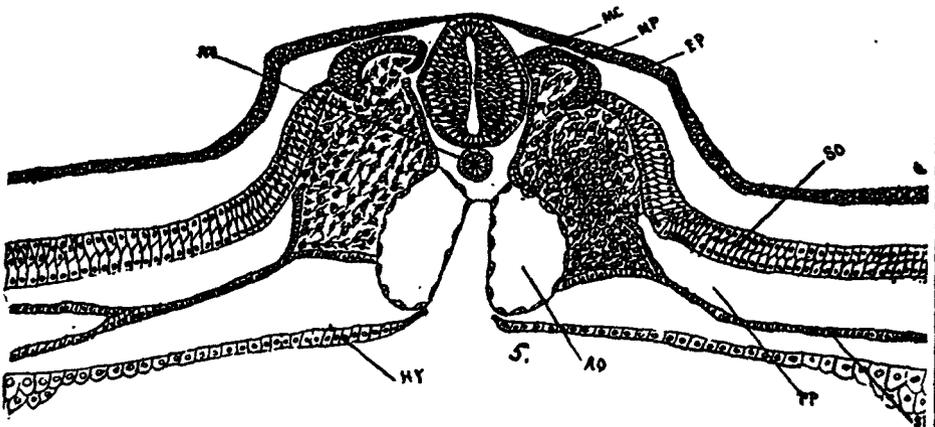
and was drawn by Mr. G. A. Hibbert. Fig. 5 is from a section through the hind end of a 3-days chick, by Mr. R. H. Herrold. Fig. 6 was drawn from a section of a 5-days chick, by Mr. J. J. Pierron, and shows the budding of the fore limbs, the development of the heart, liver, urogenital system, etc.

To anyone who has had experience in this kind of work it must be evident that many hours of painstaking labor have been spent in producing some of these drawings.

The few drawings of the spring class in biology here reproduced

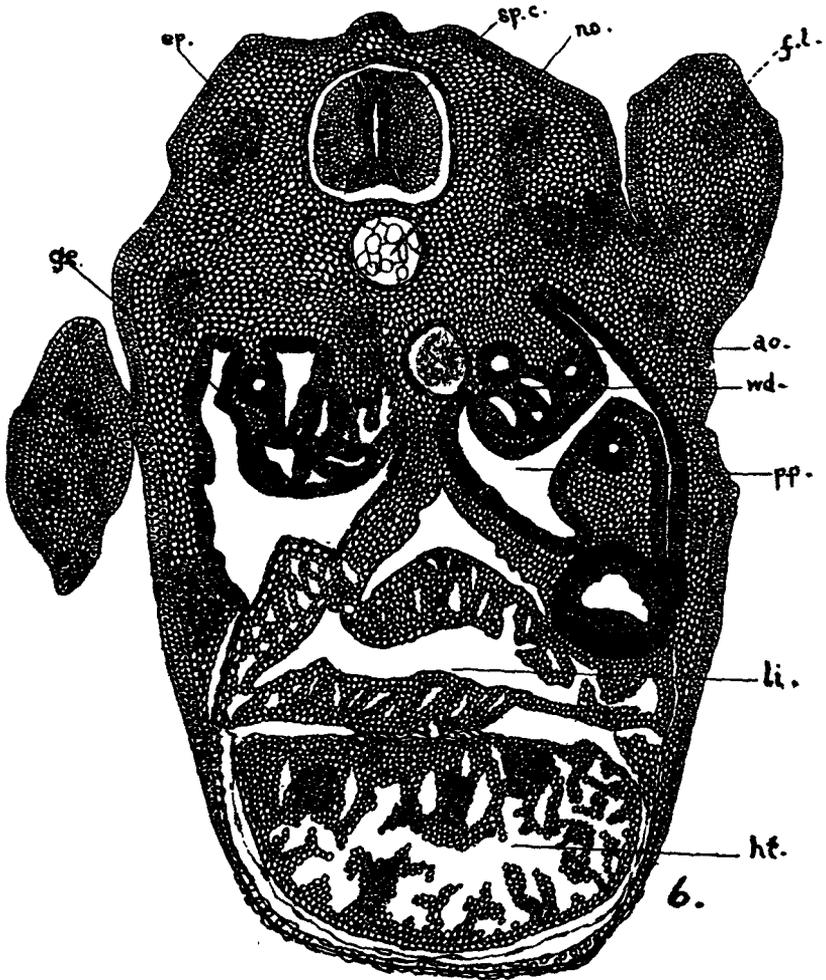


speak for themselves. They are copies of note-book drawings made by the student as he dissected the animal chosen. Huxley & Martin's Practical Biology was used as a guide in the work on



the crayfish and frog, and one familiar with this most valuable laboratory guide will know that it contains no figures of the dissections prescribed. Therefore, in this work, as in the course in

embryology, the drawings are the student's representation of what he saw as he made his dissections. Moreover, this work of reproducing the curves, elevations and depressions, distinctions between organs, etc., of the *whole object* is much more difficult than the reproduction of microscopical sections, as every scientific draughtsman knows.

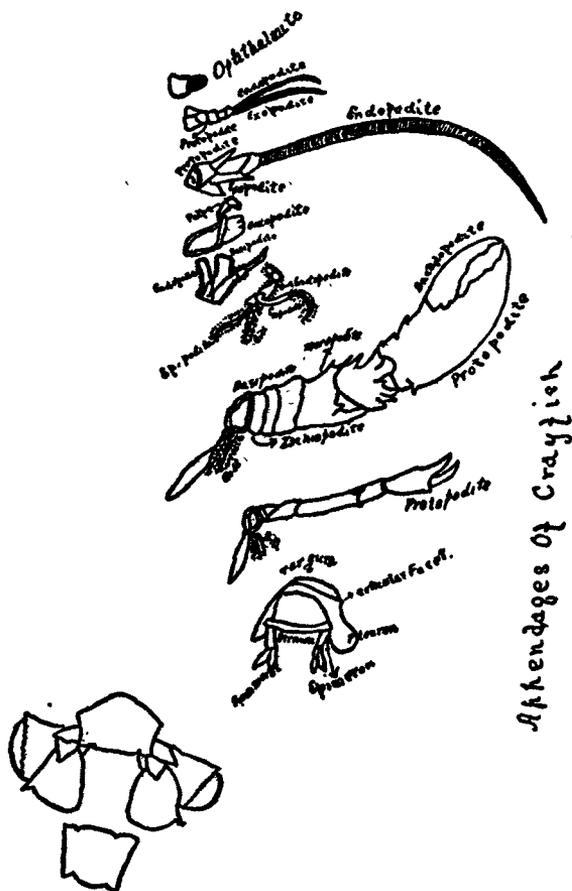


In the biological class each student carried out his own work. He made all the dissections, injections and other preparations required, himself, and then made a drawing of the completed work which he copied on the sheets of paper furnished, either in India ink or in color. It will be noted that some of the work is plain

outline drawing, while more ambitious students have shaded and colored their drawings most artistically.

Is it not reasonable to presume that a man who has dissected and verified all the intricate and minute relations of the cerebro-spinal and sympathetic nervous systems of the frog will go to his human subject with a determination of carrying out equally exact-

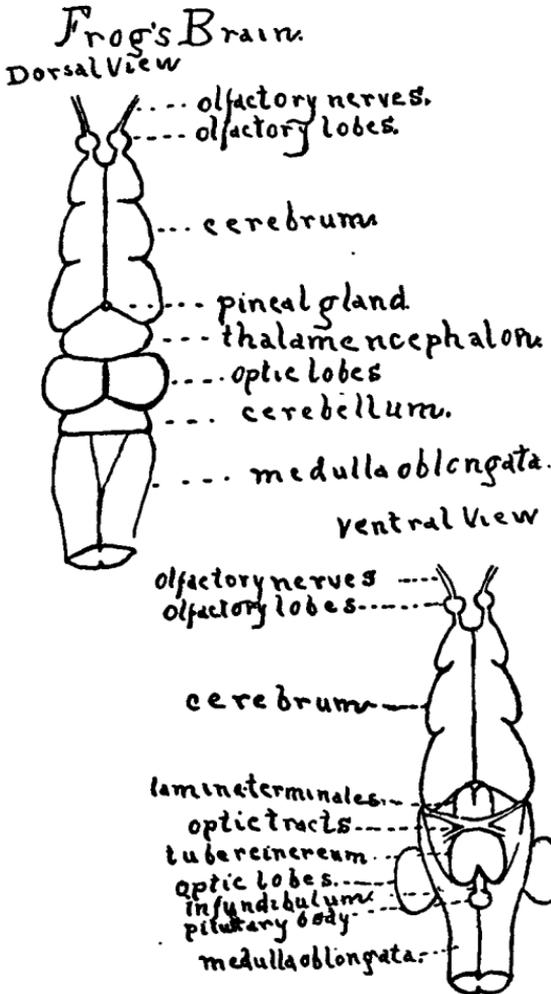
B. C. Crout



ing studies? We believe that a student who has by his own labor produced such a drawing as that made by Mr. Matthaei of the cerebro-spinal and sympathetics systems, will be a credit to himself and to his teachers in any more purely medical study.

Will not Mr. Fleming approach his studies on the human brain with a more lively interest and a broader foundation for having

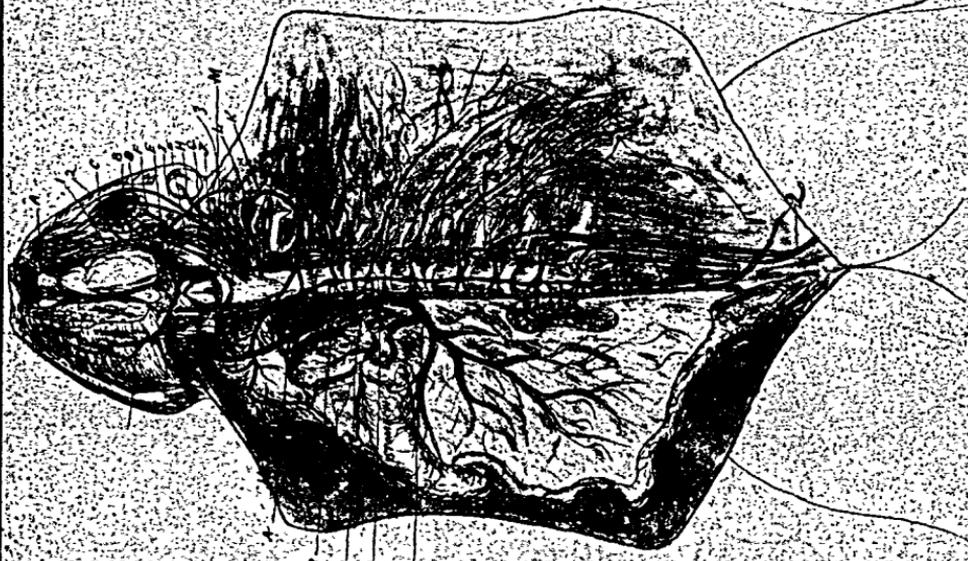
dissected and drawn this frog's brain? The subject of human osteology will lose some of its proverbial dryness for Mr. Mueller since he has made his picture of the frog's skeleton and since he became familiar with the bones of the frog's cranium, some of which are no larger than the letters of this type. The myology



of the human leg will have no terrors for Mr. Clapp who has so scientifically dissected and artistically represented the leg muscles of the frog. Mr. Grout will better appreciate the mechanism of a man's joints from having studied the appendages of a crayfish.

I wish to thank Dr. Vaughn for his interesting and thoughtful paper, and you, gentlemen, for hearing me so patiently and so long.

Cranial, spinal & sympathetic nervous system of the frog

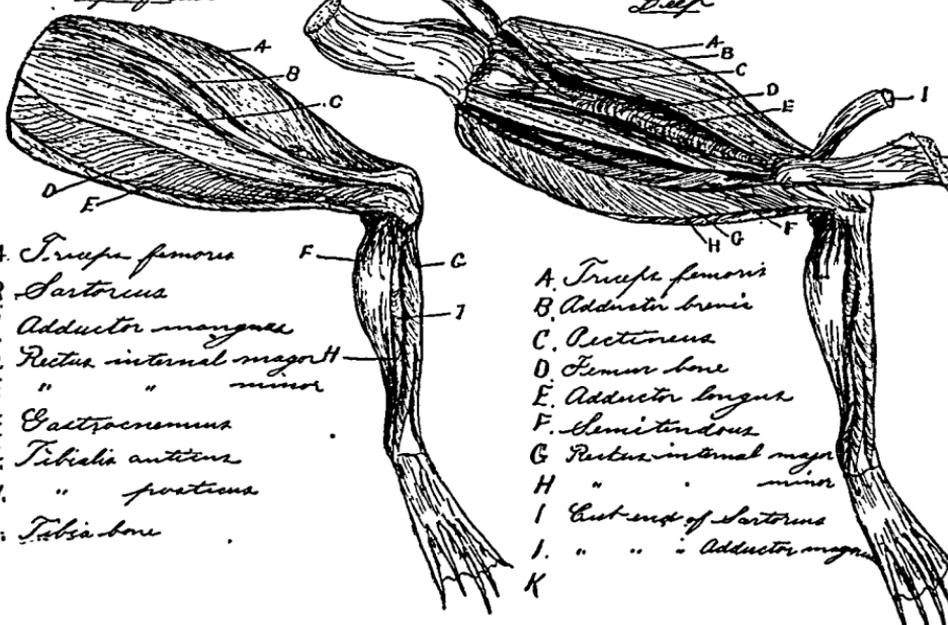


E.A. Matthaei

Muscles of the thigh & leg

Superficial

Deep



- A. *Triceps femoris*
- B. *Sartorius*
- C. *Adductor mangroae*
- D. *Rectus internus major*
- E. " " *minor*
- F. *Gastrocnemius*
- G. *Tibialis anterior*
- H. " " *proxtima*
- I. *Tibia bone*

- A. *Triceps femoris*
- B. *Adductor brevis*
- C. *Pectineus*
- D. *Femur bone*
- E. *Adductor longus*
- F. *Semitendinosus*
- G. *Rectus internus major*
- H. " " *minor*
- I. *Ant. end of Sartorius*
- J. " " *Adductor mangroae*
- K

Ventral aspect.

E.A. Matthaei

A Biographical Sketch of Nathan Smith Davis, M.D., L.L.D.

By R. O. BEARD, M.D.

It is especially fitting that the early pages of the first bulletin of the Association of American Medical Colleges should be devoted to the life history of men who have made the elevation of the standards of medical education in America an important part of their life work. And among these men none has been more closely identified with the progress of the profession in this, as in every other regard, than Nathan Smith Davis.

The subject of this sketch—the youngest of a family of seven—was born in Chenango County, New York, in January, 1817. In his early years he knew something of the hardships and discipline of a country life. He inherited the rugged physical qualities and the unswerving tenacity of purpose which had given his ancestors the conquest of the wilderness and the forest. Of studious disposition and with a natural love for scientific pursuits, he put the same characteristics to use in the world of mind which they had expended upon the world of matter. In very early youth he determined to devote himself to the profession of medicine.

The common school of his district, a term at the Cazenovia Seminary in Madison County, the preceptorship of two physicians and three lecture courses, of but four months each, afforded his opportunities of preparation. He entered upon his calling in 1837, at the age of twenty, with that keen sense of its educational deficiencies which has inspired his life-long devotion to the cause of medical education. At the very outset of his career he set himself to supply those deficiencies in his own training as in that of others. Regarding the college curriculum, as his pupils have often heard him say, but as the beginning of a course in scientific medicine, he continued his general studies in chemistry, botany and geology. Each winter he enlarged his knowledge of anatomy and surgery by dissections, beginning at the same time his life-long task as a teacher by giving private instruction to medical students.

But while with one hand he held on to the scapel, with the other he took up the pen. Three years after his graduation he took the prize of the New York State Medical Society for an essay on "Diseases of the Spinal Cord," and a year later repeated the achievement with a paper on the "Physiology of the Nervous System."

He began his practice at Binghampton, N. Y., where he remained for ten years. Beside building up an active practice in this city and its environs, he gave early evidence of his professional and public spirit by his interest as a member of the County and State Medical Societies, and as a founder of the Binghampton Academy and the Lyceum Debating Society of that city.

During the first year of his residence in Binghampton he put into practice one of his favorite precepts to young physicians—early marriage. He wedded Miss Anna Maria Parker, of Vienna, N. Y., who has not only made the happiness of his home, but has done much to maintain the amenities of his professional and social life.

In 1844 Dr. Davis came into national prominence in the profession by means of a series of resolutions which he offered at the annual meeting of the New York State Medical Society. These resolutions advocated a higher standard of medical education, and, to that end, proposed the requirement of preliminary education on the part of the candidate for admission to medical study, a material increase in the duration of lecture courses, the grading of professional studies and the determination of the graduate's fitness to enter practice by independent State Boards of Medical Examiners.

The resolutions were laid over for one year and, in 1845, Dr. Davis followed them up and put them into practical effect by proposing the call of a national convention of the medical societies and colleges of the United States to consider them. The suggestion was favorably received, and he was appointed chairman of a committee to realize the project. As the result of his energetic labors the convention was held. It led directly to the permanent organization of the American Medical Association and, better still, it initiated the educational movement which for forty years has gone on slowly but certainly to its consummation. To have contributed to the success of that movement is an honor and a recompense to him and to his many co-workers; to have originated it, as the author and promoter of the resolutions of 1844, is his own exceeding great reward.

Although largely successful in his early practice, Binghampton did not offer Dr. Davis a field wide enough for his ambition. In 1847 he went to New York City. There his personal connection with medical colleges as a teacher and with medical journals as an editor began. He accepted the double post of Instructor in Practical Anatomy and of Lecturer in Medical Jurisprudence at the College of Physicians and Surgeons; and, later, he undertook the editorial management of the *Annalist*.

But New York proved to be but his temporary abiding place. In 1849, and while actively engaged in combating the cholera epidemic of that year, he was called to the Chair of Physiology and Pathology in Rush Medical College of Chicago. He went West and has since become a part of the history of the great western metropolis.

So conspicuous were his abilities that a busy life at once opened up before him. So successful was he as a lecturer that he was soon offered a transference to the Chair of Principles and Practice of Medicine, which post he accepted, with his accustomed earnest enthusiasm, and held until 1859.

Finding a lack of organization in the medical profession of his adopted city and State, and believing heartily in the development which comes with mental attrition, Dr. Davis planned and influenced the formation of the Chicago Medical Society and the Illinois State Medical Society, in which he has since been in active membership and has often taken office.

At the time of his removal to Chicago and in the following summers cholera was epidemic. This circumstance drew his attention to the sanitary condition of the city, and he did valuable service to the people in forwarding projected improvements in its drainage and water supply. He has often done his part since then as one of the most zealous guardians of the public health.

He found the city deficient in its hospital service and, in the first year of his residence, he founded the institution which has since grown to large proportions under the name of Mercy Hospital.

Not content to abandon his labors in the line of medical journalism he undertook the control, in 1855, of the Chicago Medical Journal, and contributed largely to its success.

During the early years of his experience as a teacher of medicine, he found himself in advance of the current ideas of all that medical education ought to be. Always progressive, he believed that the times should move faster towards the accomplishment of those educational reforms which, as early as 1844, he had put before the profession. His colleagues did not sufficiently sympathize with his views, and accordingly in 1859 he severed his connection with Rush Medical College, and led a carefully chosen faculty in the organization of the Chicago Medical College.

This institution, which later became the medical department of the Northwestern University, was opened with a small class of students. The principles upon which it was founded were those which Dr. Davis had laid down fifteen years before, namely, the

preliminary education of the medical student, the increasing length of the lecture term and a graded three years' course of study. Working along those lines, the Chicago Medical College, under Dr. Davis' leadership of thirty-three years, has taken rank among the foremost medical institutions of the country. Still Dean of the college, it is but recently that he has consented to retire from active service in his chosen Chair, and has accepted an Emeritus Professorship upon the Faculty. With his retirement from Rush Medical College, his editorship of the Chicago Medical Journal, supposedly the organ of that school, ceased. A year later he founded the Chicago Medical Examiner, which he edited until 1873, when it was united with the older journal. Thereafter for several years Dr. Davis continued his active part in the editorial management. In 1883, the Journal of the American Medical Association was established, and that largely through the influence of Dr. Davis. He was selected as its editor-in-chief, and occupied that position for six years.

He was one of the most active promoters of a successful endeavor, put forth in 1885, to secure the holding of the Ninth International Medical Congress, to convene in 1887, in America. The City of Washington was selected as its gathering place; and the executive committee chose Dr. Davis, at first, for the position of secretary-general. Despite of his advanced years he entered upon the arduous labors of the office with the enthusiastic vigor which has always characterized him. Added to the calls of his extensive practice and his duties as a teacher, the strain proved well nigh too much even for his robust and elastic constitution. For the first time he was seriously, although happily but briefly, disabled.

It was fortunate, perhaps, that at this juncture (1886) he was measurably relieved from his overload of duties by his transference to the higher and more honorary position of president of the coming congress—an appointment which followed upon the death of Dr. Austin Flint, of New York, who had previously been chosen for this office.

Upon taking the gavel of the great convention, which, he held with honor to himself and satisfaction to all, he referred in touching terms to the master of the profession whose mantle had fallen upon him. His occupancy of this high position was a fitting climax of distinction in a life which has been and still is devoted to the elevation of the profession and to the public good.

In addition to the above honor he is an ex-president of the American Medical Association, honorary member of numerous

foreign and American medical societies, and has won the degree of LL. D. as a result of distinguished work in the field of medicine and science.

In his advocacy of municipal measures of sanitary reform, in his teachings of public hygiene and personal temperance, in his support of its educational institutions, he has served well as a citizen the community in which he lives.

As a physician he has enjoyed an unusual degree and quality of success, and has contributed largely to the literature, and added much to the good fellowship of his fraternity and to the dignity of his calling.

But as a teacher in medicine and as an advocate of progress in medical education, he has done his greatest work. His name has been associated with every step in the rise of the medical colleges of America. His ardor as a reformer has been prophetic of many achievements in the elevation of medical education which, to his contemporaries of the hour, have appeared impractical and ideal.

His word-portraits of the pathology, etiology and diagnosis of disease—like object lessons in the field of a mental microscope—have impressed themselves upon a generation of medical students.

Personal enthusiasm, tenacity of purpose, unending industry, a firm faith in the possibilities of his profession, and an equally firm faithfulness in the execution of his own part in realizing those possibilities, these have been the qualities which have underlain his many-sided success. Perhaps the last of these characteristics has been the most dominant one, and it might be illustrated in many of the details of his career. A continuous service of forty-two years in the wards and clinics of a single hospital, an attendance upon thirty-nine of the forty-three annual meetings of the American Medical Association, a regularity in the lectureship of his college chair which has been phenomenal—these are striking instances of his untiring love of labor and of the extent of his labor of love.

The writer—one of his many pupils—well remembers, on a day ten years ago, the responsive applause which greeted his apology to his class for the second absence from his lecture hour in thirty-three years, occasioned by the birth of a grandchild; and, a week later, after the death of his only daughter—the mother of the new-born infant—the equally sympathetic silence which met his painful suggestion that he did not need to apologize for still another lapse. It is not merely the enthusiasm of the disciple which finds a key to character in such incidents as these.

Biographical Sketch of Victor C. Vaughan, A.M., M.D.

Dr. Vaughan is a graduate of both the literary and medical departments of Michigan University. He took his medical degree in 1878, but before this he had made two considerable contributions to scientific research. In 1875 he published a new method of separating arsenic and antimony, which has since been incorporated in text-books. In 1877 he published in *The Journal of Physiology* the results of certain chemical researches in embryology, in which the question whether or not the chick during the period of incubation receives any lime from the shell was answered in the affirmative.

In 1882 the question of the guilt or innocence of a man tried for the murder of his wife by the administration of arsenic was made to depend largely upon the possibility of the diffusion of arsenic through the body when injected into the mouth and rectum after death. The standard books upon toxicology at that time taught that such diffusion would not occur, and that the presence of arsenic in the liver furnished positive proof that it was introduced into the body before death. Dr. Vaughan proceeded by direct experiment to prove that this was not true, and that diffusion would take place. The experiment was successful and it has been confirmed by others, so that at present the post-mortem diffusion of arsenic is recognized by all toxicologists.

In 1884 Dr. Vaughan succeeded in isolating a toxic base from poisonous cheese. This was followed by the discovery of the same active agent in poisonous milk, ice cream and other milk products. In 1887 a jury for the first time rendered a verdict of death from poisons generated by bacteria in milk, this verdict being founded upon the above-mentioned studies.

In these researches Dr. Vaughan was impressed with the striking resemblance between the action of this poison and the symptoms observed in the more violent forms of cholera infantum, and the belief that these cases are due to milk poisoning is now widely held and furnishes a scientific explanation of the fact, long since observed, that the discontinuance of milk is the most important factor in the treatment of cholera infantum.

In 1888 Dr. Vaughan held that while many of the summer diarrhoeas of infancy are due to poisons generated in milk by bacteria, that a number of varieties of bacteria may elaborate these poisons, and that a specific germ as the cause of these diseases would not be found. The truth of this has been abundantly

established by the bacteriological researches of Broker, Jeffries, Escherich and Baginsky.

In 1889, in a paper read before the Section on Practice at the Newport meeting of the American Medical Association, Dr. Vaughan proposed that the following rule be added to those of Koch, and that it should be especially insisted upon in those cases in which the lower animals are not susceptible to the disease:

“Before any micro-organism can be considered the true and sufficient cause of a given disease, it must be shown that the chemical products of that germ are capable of producing the characteristic symptoms and lesions of that disease in an acute form.”

Within the past few months Dr. Sidney Martin, of London, in the Goulstonian Lectures, has proposed substantially the same rule.

During the past three years Dr. Vaughan has directed his experimental studies to the etiology of typhoid fever. Upon this subject he is at variance with the majority of bacteriologists, inasmuch as he holds that the Koch-Eberth bacillus is not a specific germ, but an involution form of any one of several varieties which are widely distributed in drinking water. He has isolated from drinking water supposed to have caused typhoid fever, several germs which differ from the Eberth bacillus in manner of growth upon various culture media, but which induce the same symptoms, or similar symptoms, in the lower animals, and which when taken from the spleens of these animals after death grow upon potatoes and other media in a manner very similar, if not wholly identical, with the Eberth bacillus.

Dr. Vaughan is director of the Laboratory of Hygiene, established in 1888, and Dean of the Medical Faculty of Michigan University.

1892

COLLEGE ITEMS.

The following named colleges have extended their courses of instruction to four terms of lectures before receiving the degree of M. D.: The Department of Medicine of the University of Michigan, Harvard University Medical College, the Medical Department of the University of Pennsylvania, and the Chicago Medical College.

The annual college announcements are abroad in the land. We hear it loudly whispered that the two-term school is an institution of the past, except in a limited section of the South.

Several colleges are mourning the loss of able instructors. Among the list we find Profs. Leidey, Agnew, Formad, of University of Pennsylvania; Knox, of Rush Medical; H. A. Johnson, Chicago Medical; E. C. Spencer, of University Minnesota; and several others.

The following named colleges are expending vast sums of money in the construction of buildings, mostly for laboratory use: The Medical Department University of Pennsylvania, laboratory of hygiene; the Medical Department University of Minnesota, general administration and lecture room building, and several buildings for laboratory instruction; the Chicago Medical College, the Rush Medical College, laboratory buildings; the College of Physicians and Surgeons, Chicago, laboratory building; the Harvard University Medical College, laboratory extension.

The American Academy of Medicine expresses its approval of the efforts of the Association of American Medical Colleges to secure a fitting preliminary examination and a graded course of study for the medical student of the future.

The American Medical Association most heartily endorses the efforts of the Association of American Medical Colleges to advance the cause of medical education in the United States, and demands of the medical colleges the adoption and observance of a standard of requirements which shall in no respect fall below the minimum standard of said College Association. The Secretary, Dr. Atkinson, was instructed to serve a copy of the resolutions upon every medical college of the United States.

Prof. Rignald H. Fitz has been elected to the chair of Theory and Practice at Harvard Medical College. Prof. W. T. Councilman, of Johns Hopkins, has been elected to the chair of Pathology at Harvard Medical College. Prof. J. Warrington Earle has been elected to the chair of Obstetrics at Rush Medical College, vice Knox, deceased. Dr. Chas. L. Greene has been elected to the

chair of Surgical Anatomy, University of Minnesota, vice Spencer, deceased. The doctor is a son of the late J. Warren Greene. Prof. W. D. Middleton has been elected to the chair of Surgery, University of Iowa, vice Peck, deceased. Prof. Thos. G. Lee has been elected to the chair of Histology and Bacteriology, University of Minnesota.

In a paper read before the American Academy of Medicine, Dean Millard, of the University of Minnesota, submitted some interesting and instructive statistics from the work of several State Boards of Medical Examiners. He submitted the result of the examination of 1,950 different persons for a license to practice medicine in the following named States: Alabama, Minnesota, North Carolina, North Dakota and Virginia. Per cent of all applicants licensed, 752. Of 183 examinations from the six largest three-term schools in the country 179 were licensed, or 972 per cent. Of 435 examinations from the six largest two-term schools, 343 were licensed, or 788 per cent.

Examinations to practice medicine are required in the following named States, to-wit: Alabama, Minnesota, New York, New Jersey, North Carolina, North Dakota, Montana, Maryland, Florida, Utah, Virginia and Washington.

