her finger on her lip, and her dark eyes fixed apprehensively on his face. "Oh, my dear Garth, don't be angry! I'm afraid I do know where it might possibly be; at least—"

"You have seen it? Where?"

"Dear me! you know, when you threw down your coat, I picked it up and shook it to get the water off; and I'm afraid, dear, it must have got shaken out of the pocket. Which pocket was it in?"

"In this side pocket. That was up by the spring. I shall find it there. I'll go back at once, if you'll take the horses round, uncle."

"I'm sure I hope you will find it, dear; but I'm afraid— Oh, Garth, had it an envelope?"

"Yes—no; I left the envelope at home."

"Well, I believe I saw something I thought must be a leaf, but I guess now it must have been the letter, floating off down the little rivulet from the spring. I was so excited in your climbing the tree that I only just glanced at it, and then forgot all about it. You don't think that could have been it, dear, do you?"

"I'm afraid it was; and it may be in the brook, or even in the lake, by this time. Well, I must look for it. Luckily there's a moon. Tell father not to sit up for me, Uncle Golightley. Good-by."

He walked away, but in a few moments heard a swift rustling step behind him, and there was Madge, rosy and panting.

"Say you'll forgive me, dear Garth—and kiss me, won't you? I'm so sorry! Good-by, dear. I do hope you'll find it."

He kissed her, and left her standing in the twilight road, rosy, sparkling, and lovely. "There never was such a woman!" he said to himself: "and am not I the luckiest and happiest of men?"

THE FIRST CENTURY OF THE REPUBLIC.

[Nineteenth Paper.]

MEDICAL AND SANITARY PROGRESS.

WHAT has been done in these United States of America since the declaration of their independence in the way of medical and sanitary progress? To answer this question fully it would be necessary to write the history of American medicine, for which at least a volume would be required. In undertaking to review the past centennial period, with reference to this question, within the limits of a few pages, I must be content with a large outline and certain representative facts.

Evidence of progress is to be sought for in educational institutions. At the close of the colonial government there were two American medical colleges, one in Philadelphia, the other in New York; the former established in 1765, and the latter in 1768. The operations of both were suspended during the Revolutionary war. Up to that time they had conferred medical degrees upon less than fifty candidates. The great majority of the physicians and surgeons in the colonies had obtained what education they possessed in commencing practice by having served for a period of from three to seven years as apprentices to medical practitioners, the duties of apprenticeship embracing certain menial offices as well as study and the compounding of medicines. A favored few were able to resort to the celebrated schools of London, Edinburgh, and Leyden. At the close of the war the two American colleges resumed operations, and three others came into existence before the end of the eighteenth century, namely, the medical department of Harvard University, of Dartmouth College, and of Rutgers College, of New Jersey. The number of graduates from all these institutions at the beginning of the nineteenth century had not much exceeded two hundred. During the first half of the present century medical colleges were multiplied nearly at the rate of a new college annually, distributed among the different States, and many of them established in small villages. This multiplication and distribution met the requirements of medical education at that time, in view of the rapid settlement of distant parts of our vast country, stage-coaches being the only public mode of traveling by land, and the great majority of students and practitioners in medicine having limited pecuniary resources. After the extension of railway communications and the development of the material resources of newly settled States and Territories, the increase in the number of colleges was less, and for the most part it has been confined to metropolitan or large towns, many of those in villages having been discontinued. At the present time about seven thousand medical students attend annually the various colleges, and the annual number of graduates exceeds two thousand.* During the last quarter of a century there has been progressive improvement in collegiate and extra-collegiate instruction by means of extension of the terms of lectures, subdivisions of the different departments, the institution of special courses, combining more and more illustrations with didactic teaching, the systematic regulation

* Vide *Toner's Annals of Medical Progress* for these and other statistics. For the dates of the establishment of different schools and other details, vide *History of Medical Education*, etc., by N. S. Davis, M.D.

of study with recitations, and private lectures or demonstrations in various branches. Without presumption, it may be claimed in behalf of the leading American medical schools that especially, although not exclusively, as regards practical instruction, they compare favorably with the long-distinguished schools in Great Britain, France, and Germany.

In connection with this sketch of educational institutions it is but just to the medical profession of this country to present certain facts. To this profession belongs chiefly whatever credit may pertain to the rise and progress of these institutions now and in the past. Our State Legislatures incorporate medical colleges, and generally charters are obtained without difficulty. Legislative aid in the way of money is the exception, not the rule, albeit it is very evident that well-educated physicians and surgeons are literally of *vital* importance to the public weal. As a rule, with some notable exceptions, the pecuniary means for the establishment of a medical school are not largely furnished either by municipal appropriations or private contributions from other than members of the medical profession. After having been established, the revenue of the colleges is derived commonly from the fees of students: few colleges have any endowment. A certain measure of success in a medical school, as regards the size of its classes, is therefore essential to its continuance, and its prosperity depends on the number of students attracted to it. The primary organization and the management in all respects, including the appointment of professors, are usually, either directly or indirectly, under the control of the faculties of the schools. These facts involve some objections which are plausible, and in a measure veritable, namely, a medical college can not, without risk of its prosperity, require a higher grade of preliminary education or of the qualifications for a degree than those institutions with which it is in immediate competition, and professional positions are exposed to insecurity from the action of colleagues. On the other hand, there are advantages which more than outweigh these objections. An active, honorable competition enforces the best exertions, the selection of the ablest teachers, and the largest available facilities for instruction.

Another fact, in justice to the profession, should be presented, namely, there are practically no legal restrictions on the practice of medicine in most of the States of the Union. Not only are licenses to practice easily obtained, but rarely, if ever, are legal penalties, if they exist, enforced for practicing without a diploma or a license. The desire for instruction is therefore the leading motive impelling medical students to resort to medical schools. Moreover, the classes, especially in metropolitan medical schools, consist in part of licentiates or graduates who have been for a greater or less period engaged in practice. Again, in the schools which are considered as offering the largest advantages the classes preponderate greatly in numbers over those in other schools. At the present time more than a thousand students and practitioners are in attendance at the schools in the city of New York during the winter, and the winter classes in Philadelphia are not much smaller. A considerable proportion of the members of the classes in these two cities is from distant parts of our country, the fees are considerably higher than in provincial schools, and the expenses incident to city life and long journeys are not small. Herein is exemplified the strength of the impelling motive, namely, the desire for instruction; and these facts certainly denote a spirit of progress among those who are already, and those who are about to become, members of the medical profession.

We are to look for evidence of progress in the number and character of associations for the promotion and diffusion of medical knowledge. Prior to the Revolutionary war there was but one State medical society. This was formed in New Jersey in 1766, but not regularly incorporated until 1790. Shortly before the war closed, the Massachusetts Medical Society was incorporated. After the national independence was achieved, associations were speedily organized in several of the States. At the beginning of the present century they existed in Pennsylvania, Delaware, New Hampshire, South Carolina, Connecticut, and Maryland. Following these were local associations in different counties and large towns. At the present time probably every State in the Union has its society, and there are few situations so remote or isolated as not to be embraced within the area of some local association. In 1846 a convention of representatives of medical societies, hospitals, and colleges throughout the United States was held in the city of New York, and the result was the establishment, in 1847, of the American Medical Association, which, excepting during the late war of the rebellion, has ever since held annual meetings in different parts of the Union. Quite recently (1872) an association has been formed for the promotion and diffusion of knowledge relating to the prevention of disease. This, entitled the Public Health Association, gives promise of much usefulness. National societies within late years have been formed for the promotion and diffusion of knowledge relating to special departments of medicine—for example, insanity, and diseases of the eye and ear—and local societies of this character exist in most of the larger cities. All of the

numerous associations originated with medical men, and have been kept up by their efforts. Many publish Transactions at stated intervals. The American Medical Association has published twenty-five large volumes, and the New York State Medical Society nearly or quite as many. Collectively, the Transactions of the societies in various States constitute not an inconsiderable portion of our periodical medical literature. The associations are all voluntary; membership is not rendered obligatory by legal requirement, but in many, if not in most, parts of the country it is considered essential to an unequivocal professional status to become a member of some regularly organized association. This arises from the fact that in certain associations are vested, by general agreement, the right to take cognizance of violations of medical ethics by any of their members, and to reprimand, suspend, or expel for unprofessional conduct. Passing by further details, it may be said of our medical associations that in number and character they denote a general and active co-operation of the practitioners of medicine for the promotion and diffusion of knowledge, to which may be added the maintenance and elevation of the honor and usefulness of the profession. The associations thus furnish evidence, while they are also important means, of medical sanitary progress.

The literature of a particular province of science and art, for a given period, offers a good criterion of the progress made during that period. This statement is as applicable to medicine as to any department of knowledge. Comparing the present with the past, in this aspect, as in other points of contrast, due consideration is to be given to the difference in population, which at the time independence was declared was not much over 3,000,000, while at the present time it is estimated to be about 40,000,000.*

During the colonial government there was not entire absence of an American medical literature. Davis gives a list of twenty-eight publications, most of which were works of small or moderate size, but several of them possessing much merit on the score of originality and ability. There was no American medical periodical during this period, the first being the *Medical Repository*, the publication of which was commenced in the city of New York in 1797. This was a quarterly of about 150 pages, ably conducted, and its publication ceased with the twenty-third volume. In 1804 the publication of two medical journals was commenced in Philadelphia. The subsequent multiplication of medical periodicals and their publication in different parts of the Union constitute striking evidence of progress. At the present time there are between thirty and forty medical journals published in the United States, not including the Transactions of societies, hospital reports, and other publications properly belonging to periodical literature. The history of medical journalism in this country during the last half century would show many changes, but it is noteworthy that a quarterly journal, *The American Journal of Medical Sciences*, established in 1827, succeeding the Philadelphia *Journal of the Medical and Physical Sciences*, established in 1820, still lives, the arrangement of contents never having been changed, the present publisher the successor of the house which from the first issued this, as also the preceding work, and conducted now by the same able editor as over forty years ago. The Boston *Medical and Surgical Journal*, with divers changes, has been in existence for about the same length of time.

The bibliography of the first quarter of the present century embraces not a few able works, among which the voluminous writings of Rush are prominent. The standard works and text-books, however, were chiefly of foreign authorship. During the second quarter the number of works by American authors had largely increased, the list embracing acceptable text-books in anatomy, physiology, surgery, midwifery, the practice of medicine, and the *materia medica*. Then, as now, the absence of any international copyright restrictions favored the republication of works by British in preference to those by native authors, the former having the advantage of a success already acquired, and the reprint requiring no royalty. Here is an obstacle in the way of the development and progress of a national literature which, in justice to American authors, should be borne in mind. Notwithstanding this obstacle, and a prevailing sentiment that exotics transplanted from the older countries, as a matter of course, are superior to native productions, the increase of original books has been progressive during the last twenty-five years. At this moment the majority of the works recognized by medical schools and the profession as text-books in the different departments of medical education are by American authors, and there are few topics within the range of the science and art of medicine which are not creditably represented in our own literature. At the same time, foreign books and periodical publications now, as heretofore, have a large circulation in this country. Our native productions do not displace exotics, but both flourish together, competing with a fair rivalry.

Medical progress, as evidenced in the literature of medicine, is more especially marked in works of a practical character. This is owing to the fact that the vast majority of those who pursue medical studies in this

* Toner, op. cit.

country have chiefly in view the duties and responsibilities of the practitioner. The prosecution of researches of a purely scientific character, having no immediate practical bearing, is comparatively rare. It is easy to explain the lack of progress in this direction, as shown by comparison with other countries. The rapid increase of our population and its extension over new territory have involved a large demand for practitioners, a large proportion of whom are, to a greater or less extent, isolated as regards much intercourse with each other, and therefore obliged to depend greatly on their own resources in medical and surgical practice. Hence a predominant desire for knowledge which is plainly and directly practical. Another and more potential reason is the absence of inducements or even encouragement for purely scientific researches beyond their intrinsic attractions. Our collegiate institutions, from want of endowment, are unable to make adequate provisions for investigations which have no appreciable relations to practical teaching; the policy of our State governments, already referred to, is to leave the cultivation of all the departments of medicine in the hands of the medical profession, without offering incitements or rewards, and the spirit of emulation is not what it would be were there a larger number in the field of original scientific investigations. These are the reasons for the fact that the medical literature of this country up to the present time, as compared with that of other countries, is deficient in what may be distinguished as scientific in contrast with practical medicine. A list of American publications relating to medicine and sanitary science during the last hundred years would show a steadily increasing progress in this direction, and such a list would include not an inconsiderable number of works of a purely scientific character. The reader who may desire information concerning the medical bibliography of our country is referred to a late publication, entitled *History of American Medical Literature from* 1776 *to the Present Time*, by Professor S. D. Gross, of Philadelphia.

Within the past few years subjects relating to sanitary knowledge have entered into our literature more largely than heretofore. The publications by Health Boards have been of much interest and value. These subjects have also occupied a considerable share of medical journals and the Transactions of medical associations, and at the present time there is at least one journal devoted specially to this department of knowledge. It is fair to acknowledge that the recent activity in this direction is in a great measure due to the labors prosecuted under governmental co-operation and support in Great Britain and other countries. The attention now given to what has been called "preventive medicine" may be especially referred to as evidence of progress. To promote public health by removing or lessening the causes of disease, to forestall epidemics and endemics or arrest their course, are objects of medical science higher in importance than therapeutics. The truth of this statement is recognized by the philosophic and philanthropic physician; and there is ground for the belief that already the study of sanitary science has led to the saving of much life. Were it consistent with the limits of this article, I might cite the facts in the history of epidemic cholera in the city of New York in 1866 and 1867 as proof that by prompt and efficient preventive measures this disease may be effectually "stamped out."* Sanitary science and medical science are to a great extent convertible terms, as implied in the name, preventive medicine. The prevention of diseases is the practical result of our knowledge of their character and causes. Our knowledge of the causes of diseases, more especially of the special causes which give rise to epidemics and endemics, is confessedly defective; thus far in the history of medical and sanitary progress we have been obliged to content ourselves with the investigation of their laws without being able to determine with positiveness their essential nature and mode of production. Conceding this, it is, perhaps, not an extravagant assertion to say that, with our present knowledge and experience, by means of the skillful employment of disinfecting agents, together with other sanitary measures, the prevalence of certain diseases—epidemic cholera and yellow fever—is within the power of scientific control. In this direction of progress there is reason to hope that much will be accomplished by continued investigations. For carrying on these investigations and enforcing sanitary measures the co-operation of the public and legal powers is essential; hence the importance of awakening public interest on the subject, and diffusing as far as practicable popular information.

In this connection may be mentioned improvement in quarantine regulations. The problem in the department of sanitary science relating to quarantine is to provide to the utmost extent for the public health, with the least interference with personal freedom and the interests of commerce. A review of the history of quarantine laws would show how great has been the progress toward the solution of this problem, as a result of the increase of knowledge of the causes of disease and of preventive measures. From the necessity of resisting a

* Vide reports of the Metropolitan Board of Health, New York, for these years.

temptation to enter into details, I must be content with the general statement that the quarantine regulations of our large commercial cities at the present time exemplify the progress made within late years in this most important matter.*

Medical and sanitary progress, as evidenced by important discoveries or improvements, next claims attention. Of course those originating in this country are more especially characteristic of American progress, yet the ready adoption of discoveries and improvements which have originated in other countries is significant of a progressive spirit.

The greatest event in the medical history of the last centennial period, the whole world included, was the announcement of the discovery of vaccination. Jenner announced his discovery in a paper "printed for the author" in 1798. He had desired that the paper should appear under the auspices of the Royal Society of London, but it was declined by that learned body on the ground that its publication would damage the reputation which the author had already acquired by some observations on the cuckoo! If we recognize as a criterion of the importance of a discovery the saving of human life, that of Jenner far transcends any other in the history of the world. A medical writer in 1849 represents the number of lives saved as follows: "In England alone the absolute mortality from small-pox is less by 20,000 a year than it was half a century ago. If a similar rate of reduction in the number of deaths from small-pox holds good, as we have every reason to believe is the case, in the other kingdoms of Europe, then, out of the 220,000,000 of people that inhabit this quarter of the globe, 400,000 or 500,000 fewer now die of small-pox than, with a similar population, would have died from this malady fifty years ago. .....During the long European wars connected with and following the French Revolution it has been calculated that five or six millions of human lives were lost. In Europe vaccination has already preserved from death a greater number of human beings than were sacrificed during the course of these wars. The lancet of Jenner has saved far more human lives than the sword of Napoleon destroyed."†

The introduction of vaccination met with virulent opposition in England. It was scouted by many as entailing on man diseases of inferior animals, as likely to cause a physical and mental deterioration of the human race, and as an impious attempt at interference with the ordinances of Providence, so that many years elapsed before the importance of the discovery was practically recognized in the country so much honored by the nativity of the discoverer. We have a right to take credit for the promptness with which vaccination was adopted in this country, and for its being popularized with comparatively small opposition. In 1799 Professor Benjamin Waterhouse, in Boston, having obtained the virus from Jenner, vaccinated four of his own children. In 1801 Dr. Valentine Seaman procured virus from the arm of a patient who had been vaccinated by Dr. Waterhouse, and performed the first vaccination in the city of New York; and in 1802 an institution was established in New York for the purpose of vaccinating the poor gratuitously and keeping up a supply of the virus. Not going into further details, may not the introduction of vaccination in this country be cited as indicating at that day a spirit of medical and sanitary progress?

Numerous examples of the ready adoption in this country of discoveries and improvements of lesser magnitude than the discovery of vaccination might be cited in illustration of a spirit of progress. I will mention but two of these, namely, the discovery of auscultation, and the employment of the thermometer in the study of diseases. Laennec's discovery of auscultation was an event of great importance in the history of medicine. By means of the physical signs determined by listening to sounds within the chest, the different affections of the lungs and heart are now readily distinguished from each other, and our knowledge of the symptoms and laws of these affections has been brought to great perfection. The great work by Laennec on auscultation was published in Paris in 1819. It was translated into English by Dr. Forbes, of London, in 1821. The importance of this new method of examination was not at once appreciated either in France or other countries in Europe. It met with indifference, skepticism, and ridicule. At that time crossing the Atlantic for medical improvement was a great undertaking. Nevertheless, not a few of the young medical men of this country resorted to Paris, London, and Edinburgh with that purpose. The stethoscope of Laennec, through their agency, was speedily in use on this side of the Atlantic. The writer can testify that, as far back as 1832, the facts of auscultation entered largely into medical teaching. At this time an important physical sign had been discovered by a most promising American physician, who died as he was just entering upon an active professional life.* In 1836 a prize was offered for competitive

* The reader interested in this matter is referred to a paper entitled *Quarantine: General Principles affecting its Organization*, by S. Oakley Vanderpoel, M.D., Health Officer of the port of New York, etc., 1875.

† Sir James Simpson on anæsthesia, etc., 1849.

* James Jackson, Jun., of Boston.

dissertations on this together with other methods of exploration, the successful competitor being Oliver Wendell Holmes, whose early labors in medicine were of a character to occasion in the minds of those devoted to this department of knowledge a feeling of regret that his talents have been diverted to the pursuits of literature, in which he has achieved such great distinction.

The employment of the thermometer in practical medicine is of recent date. Although advocated and to some extent exemplified by previous medical observers, it is chiefly owing to the labors of Wunderlich, in Germany, that this instrument is now in common use in the practice of medicine. Simple as seems the proposition to determine the heat of the body in diseases by exact measurement, in place of the fallacious evidence afforded by the sensations of the patient or the physician's touch, its importance has only been appreciated within the last ten or fifteen years. Wunderlich's labors have established certain thermometric laws in disease which are now considered as of great value in estimating danger and in discriminating diseases from each other. The promptness with which medical thermometry was adopted in this country, and the very general use of the thermometer, may be mentioned as evidence of a spirit of progress.*

Passing now to discoveries and improvements originated in this country, I must restrict myself to certain of those which are prominent, overlooking much that it would be culpable to omit in a history of American medicine. Adopting a chronological arrangement, the formidable surgical operation known as ovariotomy is the first in the series.

This operation was performed for the first time by Ephraim M'Dowell, of Danville, Kentucky, in 1809. After having performed it in two other instances, he reported very briefly the three cases in the *Eclectic Repertory and Analytical Review*, in 1816. The operation was successful in each of the three cases. He subsequently performed it ten times, making the whole number of cases thirteen, of which eight, at least, were successful. Although never before performed, the possibility and propriety of the operation had been advocated, especially by John Bell, a distinguished teacher of anatomy and surgery in Edinburgh. M'Dowell was a private pupil of Bell in 1793 and 1794, and it is probable that the determination was then formed to undertake the operation whenever the opportunity offered.

M'Dowell's report of cases was received with incredulity, and the operation was not repeated by any other surgeon until the year 1821, when it was performed by Nathan Smith, Professor of Surgery in Yale College. It was performed by the latter surgeon without the knowledge of M'Dowell's previous operations. For more than twenty years it was practically almost ignored in this country, and during the next twenty years it encountered much opposition from members of the medical profession. Within the last fifteen years this opposition has in a great measure ceased, and the number of operations has progressively increased, so that in 1871 the number of reported cases amounted to 739, an analysis of 660 of the cases giving a success of sixty-eight per cent.*

M'Dowell's report of his first three cases was published in Great Britain in 1824. Here too it was received with incredulity. The editor of the most influential of the English medical journals at that time, the *Medical and Chirurgical Review*, applied the quotation, *Credat Judæus, non ego.* Subsequently he used this language: "In despite of all that has been written respecting this cruel operation, we entirely disbelieve that it has ever been performed with success, nor do we think it ever will." Having quoted this extract, another should be added, taken from the same journal of the following year (1826): "A back settlement of America—Kentucky—has beaten the mother country, nay, Europe itself, with all the boasted surgeons thereof, in the fearful and formidable operation of gastrotomy with extraction of diseased ovaries. In the second volume of this series we adverted to the cases of Dr. M'Dowell, of Kentucky, published by Mr. Lizars, of Edinburgh, and expressed ourselves as skeptical respecting their authenticity. Dr. Coates, however, has now given us much more cause for wonder at the success of Dr. M'Dowell; for it appears that out of five cases operated on in Kentucky by Dr. M'Dowell, four recovered after the operation, and only one died. There were circumstances in the narratives of the first three cases that caused misgivings in our minds, for which uncharitableness we ask pardon of God and Dr. M'Dowell of Danville." The first cases in Scotland proving unsuccessful, the operation was not repeated for twenty years. In England it was first successfully performed in 1836. Here, as in America, under considerable violent opposition, operations within the last twenty years have multiplied rapidly, so that in 1863, 377 cases had been reported, sixty per cent. of which had been successful. In 1870 the number of operations performed in England had increased to 1000 or 1100, more than 300 having been performed by one surgeon. In France ovariotomy was first per-

* The remarks in relation to the thermometer are equally applicable to two still more recent improvements in the means of investigating the phenomena of disease, namely, the ophthalmoscope and the laryngoscope.

* Peaslee on ovarian tumors, 1872.

formed in 1844, and was successful. The operation was here denounced by distinguished surgeons. In 1870 there had been reports of 190 operations, all but seven after 1862, the percentage of success being less than in England and America. In Germany in 1870 there had been 180 operations, with a percentage of only forty-one per cent. of recoveries.*

I have cited the foregoing historical facts in order that the non-medical reader may to some extent appreciate the importance of this operation. That it has saved many lives can not be doubted; and if in some instances life might not have been destroyed by the disease, the successful performance of the operation has relieved patients from a distressing burden and deformity. Its origination, therefore, is one of the prominent events illustrative of American medical progress. When the large size of the ovarian tumors is considered, together with the nature of the operation—opening the abdomen by a long incision, and exposing the contained viscera—one can not but admire the boldness, self-confidence, and philanthropy which led to this great surgical achievement.

Other important surgical operations were performed in this country for the first time not long after the operations of M'Dowell. Early in the past centennial period the great John Hunter introduced a new operation for the cure of popliteal aneurism. Previously the operation had been opening the aneurismal sac, removal of the fibrinous or bloody clots contained within it, and tying the artery above and below it—an operation attended with not a little risk of life from loss of blood and subsequent dangers, rendering it often unsuccessful. The Hunterian operation, as it was termed, consisted in tying the femoral artery at a distance from the tumor, leaving the latter to diminish or disappear from the gradual absorption of its contents. An account of this great improvement in surgery was first published in 1787.

Hunter's operation opened up a new field in practical surgery, namely, the ligation of arteries of a still larger size, not only in cases of aneurism, but to arrest hemorrhages, and for the relief or cure of certain local affections. Successive operations in this new field are among the most striking of the events denoting progress during the next thirty years. American surgeons took a prominent part in these operations. Abernethy tied the external iliac artery, in the groin, for aneurism in 1802. Stevens in Santa Cruz and Atkinson in England had tied the internal iliac artery, the former with and the latter without success, when the operation was successfully performed by S. Pomeroy White, of Hudson, New York, in 1827. In the same year Valentine Mott successfully tied the common iliac artery in a case of aneurism. This artery had been tied but once previously, and in that instance the operator was an American surgeon, Gibson, then of Maryland, afterward of Philadelphia. In the latter case the operation was to arrest hemorrhage after a wound in the abdomen. The carotid artery on one side was first tied by Sir Astley Cooper in 1808. At that time probably no surgeon would have ventured to tie the common carotid artery on both sides. This was done in 1829, by Mussey, an American surgeon, twelve days intervening between the two operations. The disease was aneurism by anastomosis; the aneurismal tumor was afterward removed, and the patient recovered.

Tying the subclavian artery above the collar-bone had been attempted by Sir Astley Cooper, and the operation abandoned, in 1809. Subsequently the operation had been performed in Great Britain four times, but in each case without success, when it was for the first time successfully performed by Wright Post, of New York, in 1817. In 1818 Valentine Mott performed the difficult and bold operation of tying the innominate artery. This operation, in the language of his biographer, Professor Gross, "gave him a world-wide reputation, and placed him in the very foremost rank of the illustrious surgeons of his day." To appreciate the operation, some knowledge of anatomy and physiology is requisite. Suffice it to say that the innominate artery, situated in "fearful proximity to the heart," is the vessel which distributes the blood to the right side of the head and the right upper extremity. Cutting off suddenly with a ligature the flow of blood through this vessel, the reliance for the circulation of blood in the parts just mentioned is upon the communications between its branches and those of other arteries. Appreciating the sense of responsibility which the surgeon must have felt in venturing on such an operation for the first time, we can sympathize in the intense anxiety as thus described by his biographer: "Doubtful whether so large a quantity of blood could suddenly be intercepted so near the heart without very serious effects upon the brain, he drew the cord very gradually, with his eyes intently fixed upon the patient's countenance, determined to withdraw it instantly if any alarming symptoms should arise. His feelings had been wrought to the highest pitch, and we may therefore easily imagine the relief he experienced when he perceived, to use his own language, 'no change of feature or agitation of body.'" The operation was not successful, the patient dying from secondary hemorrhage twenty-two days after its per-

* For further details vide Peaslee, op. cit.

formance; the fact, however, that so large a vessel may be tied with impunity was demonstrated. The operation was afterward repeatedly performed, without success, owing to the occurrence of hemorrhage. It was reserved for an American surgeon at length to perform it with complete success. In 1864 this artery was tied by A. W. Smyth, of New Orleans. Repeated hemorrhages having taken place, as in the other cases, Smyth, fifty-four days after the operation, tied another of the arteries carrying blood to the brain—the vertebral artery—and by this second operation the loss of blood was controlled. The patient recovered.

I have referred to the tying of large arteries with some detail, because these successive operations represent important discoveries and improvements. It has been seen that with these operations the surgeons of this country were in no small measure identified. I do not refer to other great surgical operations performed by Mott and others, showing knowledge, skill, and boldness in the operations. It would be an injustice to distinguished members of the profession to omit doing this were I writing a history of American medicine; but the object of this sketch, it is to be borne in mind, is not to do honor to the individuals by whose attainments and labors the profession has been honored, but to cite representative facts as illustrative of progress.

The next important event belonging in this series pertains to physiology, namely, the remarkable observations of Beaumont in relation to digestion. A Canadian boatman, named Alexis San Martin, from an accidental discharge of a musket loaded with buckshot, was wounded in the abdomen, and recovered with a permanent opening into the stomach. He was under the care of Beaumont, a surgeon of the United States army, who at once recognized the opportunity of making important observations and experiments, the opening enabling him to withdraw the contents of the stomach at will without any injury to the patient. Prior to this time it had been ascertained that the processes of digestion in the stomach were dependent on the presence of a secreted liquid—the gastric juice. This liquid, however, had never been obtained in so large quantity and in such a state of purity as was now practicable. Beaumont, securing the co-operation of the patient, and keeping him daily under observation from the year 1825 to 1832, studied with great patience and ability the character of this liquid when withdrawn from the stomach, and the successive changes taking place in the aliment during digestion. The effects of the gastric juice upon different kinds of nutriment out of the body were carefully observed; the relative digestibility of the various articles of food within the stomach was accurately determined, and the effects of disturbing extrinsic influences were noted. Beaumont published an account of his experiments and observations in 1834. This event was one of great importance in the progress of physiology. The facts contained in his publication at this day are to be found in the physiological text-books of all countries. Within late years experimental physiologists have been accustomed to produce, in inferior animals, especially in the dog, an artificial communication with the interior of the stomach such as was occasioned by accident in the case of the Canadian boatman, in order to obtain the gastric juice, and to demonstrate its effect upon food both within and without the organ. It is obvious, however, that the results of these experiments and observations could not be considered as representing, in all regards, facts pertaining to digestion in man, and hence, as furnishing a standard for comparison, those made by Beaumont are invaluable.

I come now to the crowning event in the history of American medical and sanitary progress during the last centennial period. If it be admitted that every thing pertaining to the physical universe and to living beings is in conformity with an infinitely intelligent and wise government, diseases exist for certain purposes, and the means of preventing, controlling, and ameliorating them acquired by human knowledge are not left to chance. The history of medical and sanitary progress in the past shows that epochs characterized by great discoveries do not occur in rapid succession. Jenner's discovery at the end of the last century constituted a great epoch. The discovery of the useful application of anæsthetics may be considered as constituting the second great epoch within the last centennial period. Had it been announced a century ago that ere long surgical operations were to be divested of suffering, that the law of distress in child-birth imposed upon woman in the primeval curse was to be abrogated, and that pain need no longer be an element in many diseases, would not such an announcement have seemed as marvelous, to say the least, as that, by means of steam, the Atlantic Ocean might be traversed in less than ten days, the American continent in a still less number of days, and that, through the agency of the electrical current, a communication could be sent around the globe in the space of a few minutes?

The successful application of anæsthesia by the inhalation of ether, or etherization in surgery, was first demonstrated in Boston, in 1846. The first application in operative midwifery was also made in Boston, in 1847. Chloroform, which was speedily to a considerable extent substituted for sulphuric ether as the anæsthetic agent, was intro-

duced by Simpson, of Edinburgh, shortly after the discovery of etherization. It is needless to dilate on the inestimable boon which anæsthesia, in its various useful applications, has conferred on mankind. The annihilation of pain was so obviously such a great blessing that almost the only questions ever raised in opposition have related to the impossibility of absolute security against the occasional loss of life from the anæsthetic agent. Of the two anæsthetic agents, ether and chloroform, the latter has been generally employed in Europe, and also to a considerable extent in this country. A combination of the two agents is sometimes employed. The danger to life is undoubtedly greater from chloroform than from ether, but the administration of the latter is more difficult, and the inhalation is often disagreeable: these are the reasons for the preference given so largely to the former. The danger from ether is almost *nil*, and that from chloroform is exceedingly small. Thus, at Guy's Hospital, London, chloroform had been used in more than 12,000 cases before any serious accident occurred, and in the Crimean war it was administered more than 25,000 times without a single death.*

It is difficult to appreciate blessings without taking as a stand-point a period when they were not enjoyed. Events with which we become familiar cease after a time to excite wonder or admiration; and when the mind becomes accustomed to extraordinary acquisitions, they seem to have come as a matter of course. If we go back to the time when severe, tedious surgical operations were performed without anæsthesia, recalling the prolonged agony of the sufferer, the strongest endurance tasked to the utmost, the patient sometimes requiring to be forcibly restrained by powerful assistants, or confined by straps to the operating table, one can form an adequate estimate of the precious discovery of a prompt, efficient, and safe method of annihilating pain. Contrast with the picture just presented the severest of operations at the present day, the patient falling easily and quickly into a quiet sleep, and awakening to find, to his astonishment, that all is over! This contrast might be extended to cases of severe, protracted confinements, and also to certain diseases characterized by intense suffering. But the advantages of anæsthesia are not limited to the relief of suffering. The annihilation of pain often contributes to recovery; for the shock and exhaustion caused by pain may do much toward an unfavorable termination after surgical operations, or in cases of confinement and disease, and may even be the immediate cause of death. Anæsthesia thus has been the means of the saving of human life. Moreover, it has had this effect in another mode. Patients heretofore sometimes preferred death to the terrible trial of painful operations which now have no terrors. There is still another application in which anæsthesia is of incalculable benefit. It enables the surgeon or physician to make careful and thorough examinations after injuries, and to explore by appropriate means internal parts, the requisite manipulations heretofore causing so much suffering that they were thereby impracticable or hazardous.

It would be pleasant to connect the discovery of the useful applications of anæsthesia with the name of a discoverer holding a position as a benefactor of mankind like that of Jenner. While we claim for our country the honor of the discovery, the circumstances connected with it are not in all respects agreeable or creditable. The merit of the discovery seems due to the late Horace Wells, a practicing dentist in Hartford, Connecticut. He first made the application to himself, inhaling the nitrous oxide gas, and having a tooth extracted while insensible from this anæsthetic. Afterward he employed this agent for the same purpose in several instances. He attempted to bring the matter before the profession by a public demonstration at the medical college in Boston, but his experiments not proving successful on that occasion, he met with ridicule instead of encouragement. Driven to despondency and insanity, he subsequently committed suicide. His successful applications of the nitrous oxide gas were made in 1844. Morton, a dentist in Boston, who had been a pupil of Wells, subsequently made experiments upon himself and others, using as the anæsthetic agent sulphuric ether. In the selection of this agent and in the manner of using it he was guided by C. T. Jackson, a distinguished chemist in Boston. It was by Morton's solicitation that John C. Warren was induced to perform, at the Massachusetts General Hospital, an operation for the removal of a tumor of the neck on a patient rendered insensible by the inhalation of ether. The anæsthesia in this instance was not complete, but the suffering from the operation was evidently diminished. On the following day an operation was performed by George Hayward on a patient etherized by Morton and rendered entirely insensible. This was the first completely successful application to a surgical operation, exclusive of the previous experiments for the extraction of teeth. From that date the employment of anæsthesia rapidly extended. To Morton is due the credit of accomplishing the practical application of anæsthesia to surgical operations, but he probably derived the idea from his preceptor, Wells. Jackson suggested ether in place of the nitrous oxide gas, and aided

* Gross's *System of Surgery*.

Morton by his chemical knowledge. Unhappily Morton and Jackson were led to declare the anæsthetic agent a compound which they kept a secret, calling it *letheon*, and obtaining a patent for it as a joint discovery. Such a procedure is in violation of medical ethics, and was in no wise creditable. Afterward each claimed to be the discoverer. These circumstances, together with the conflicting statements and acrimonious discussions which followed, are painful to think of in connection with a discovery which has rendered such great service to mankind.

In referring to the extraction of teeth in connection with anæsthesia, I have not considered this in the light of a surgical operation, but inasmuch as most persons have had more or less practical acquaintance with it, to describe the painfulness of the process were superfluous. It is worthy of note that the inhalation of the nitrous oxide gas, the anæsthetic agent with which Wells experimented, is now largely used to render painless the extraction of teeth. The anæsthesia induced thereby is not sufficiently lasting for most surgical operations, but it answers for this purpose; and thus far, having been administered many thousand times, it has not been followed by any serious consequences. In this regard the dentist's chair is now deprived of all its terrors: after a moment of pleasant dreams, its occupants awaken to find the offending members gone.

Passing from the foregoing brief account of the more notable of the discoveries and improvements exemplifying medical and sanitary progress, I must be satisfied with a cursory notice of some of those of lesser importance, belonging, for the most part, to the history of the last forty years. I desire to premise distinctly that I by no means undertake to include in the following list all, or even the greater part, of the minor contributions which have been made during this period to the science and art of medicine—using the term medicine here, as hitherto, in its comprehensive sense, which embraces every thing relating directly or indirectly to surgery and obstetrics, as well as to the study of the human organism in health and in disease. My object is simply, as already noted, to cite illustrations of the co-operation of our country in medical progress, and the facts cited are those which suggest themselves in my own retrospection.

The substitution of simple manual efforts for pulleys and other mechanical appliances in the reduction of dislocations of the hip joint is an American improvement. It had been taught by Nathan Smitt and practiced by Physic, but for its complete exposition and popularization the profession is indebted to the late W. W. Reid, of Rochester, New York. By means of the improvement, quoting the words of an eminent surgeon, "the reduction of this dislocation is no longer, as it once was, the dread of the surgeon and the terror of the patient." Reid published his experiments and observations in 1851.

In 1848 Gurdon Buck reported a series of cases in which the rare and fatal affection known as œdema of the glottis had been successfully treated by scarifications of the glottis and epiglottis. This affection in some instances destroys life very suddenly, and the only resource is in prompt surgical interference. Buck's simple operation was a substitute for opening the larynx, or laryngotomy. The operation was original with him, although it was afterward ascertained that it had been performed by Lisfranc, of Paris, but without having attracted attention.

In 1850 H. I. Bowditch resorted to puncture with a small-sized instrument and the employment of suction for the purpose of withdrawing morbid liquids from the chest. He subsequently employed this method in cases of pleurisy in a very large number of cases, and also applied it to the removal of purulent liquid in other situations. The method has been since employed by others in this country and in Europe with great success. Latterly, under the name of aspiration, it has become popularized, and it is one of the most important of the improvements in practical medicine within the last quarter of a century.

In 1846 Horace Green published a work on diseases of the air passages, in which he asserted that it was practicable to introduce an instrument through the mouth into the larynx, and in this way to make topical applications in the treatment of diseases here seated. The assertion was at first received with much incredulity and distrust, the feasibility of the operation being by many denied. On this point, however, at the present time few, if any, are skeptical.

In 1848 Jonathan Knight, of New Haven, Connecticut, reported the first successful case in which recovery from aneurism was effected by means of digital compression—a method of treatment which has since been resorted to successfully in a considerable number of cases.

Of American surgeons now living or recently deceased a considerable number have rendered valuable service by either originating or modifying operations, and by contributions to surgical literature. In this list are Gross, who most appropriately heads it, and whose voluminous writings are held in the highest estimation not only in this country but abroad; Hamilton, whose treatise on fractures and dislocations is recognized as a standard work in all countries; Sayre, whose original operations on diseases of joints and ingenious improvements in orthopædic surgery have secured for him transatlantic honors; Brainard, John C.

Warren, his son, J. Mason Warren, George Hayward, Henry I. Bigelow, James R. Wood, Van Buren, Parker, Markoe, Eve, Moore, and many others whose names would not be omitted in a full history of the progress of American surgery. To all justice will doubtless be done in papers to be presented at the Centennial International Medical Congress to be held in Philadelphia in September next.

Important improvements in certain operations for the treatment of the accidents incident to confinement and the diseases of women have been contributed within the last quarter of a century by J. Marion Sims, James P. White, T. G. Thomas, Emmet, Peaslee, Barker, and others whose names are identified with the literature of this department of medicine. To notice these contributions more specifically would in this article be out of place.

The foregoing improvements relate to practical surgery, and, for obvious reasons, they are more easily characterized than those relating to the remedial or other measures of treatment in cases of disease. An improvement pertaining to the physical diagnosis of the diseases of the chest may be mentioned, namely, the binaural stethoscope invented by Canmann in 1854. The advantages of this acoustic instrument in the practice of auscultation are such that, unless it be superseded by further improvements, it must take the place of the various stethoscopes devised since the time of Laennec.

Let it not be inferred, from the omission to specify original views and improvements relating to the treatment of diseases, that progress in the latter within late years has been less marked than in surgery. The writings and oral teachings of such men as James Jackson, John Ware, Bowditch, and Shattuck, of Boston; George B. Wood, Dickson, Stillé, J. R. Mitchell, Da Costa, and La Roche, of Philadelphia; Davis and Alien, of Chicago; Elisha Bartlett, Swett, and Alonzo Clark, of New York; and Daniel Drake, of Ohio, have rendered the science and art of medicine in this country steadily progressive. In this connection reference should be made to a discourse, published in 1835, "on self-limited diseases," by Jacob Bigelow, of Boston, which led physicians in this country to recognize more fully than before the important fact that many diseases tend intrinsically to recovery, and to appreciate the importance of the study of the natural history of diseases.

Important contributions to the *materia medica* have not been wanting. As long ago as 1807 the remedy known as ergot was brought to the notice of the profession by Dr. Stearns, and named by him *pulvis parturiens*, a term expressive of its peculiar operation in cases of confinement. Its potency in the application denoted by this term has since been every where recognized, and of late it has been found to have a much wider range of usefulness, being now regarded by many as possessing much efficiency in arresting hemorrhages in different situations. The veratrum viride was employed as a medicine by Tully, Osgood, and other physicians in New England as far back as 1835; but it was brought forward more recently (1850) as a remedy of great power in producing a sedative operation on the heart, by Norwood, of South Carolina. The lobelia, or Indian tobacco, is also an American remedy, introduced to the notice of the profession by the Rev. Dr. Cutter, of Massachusetts, for the relief of asthma, and afterward much used as a palliative in that disease both here and abroad. The use of the anthelmintic remedy, chenopodium or worm-seed, originated in Virginia in the early part of the present century. The anæsthetic agent, chloroform, so extensively used since its employment by Simpson in 1848, was discovered by Guthrie, of Sackett's Harbor, New York, at about the same time that it was also discovered by Soubeiran, at Paris, in 1831.

The medical history of our country within the last quarter of a century is not altogether barren in contributions to anatomy and physiology, albeit the tendency to studies having a direct and obvious practical bearing is predominant. The researches of Isaacs in relation to the structure of the kidneys were characterized by great minuteness, completeness, and accuracy. They have been so considered and adopted in Europe as well as in America. Brown-Séquard, although not a native of this country, is of American paternity, his father having been born in Philadelphia. Moreover, a considerable part of his anatomical, physiological, and pathological labors have been prosecuted and the results originally published here. He has contributed largely toward our knowledge of the structure, functions, and morbid conditions of the nervous system; also important facts relating to other organs and functions of the body. Bennett Douler, of New Orleans, had made valuable contributions to our knowledge of the temperature of the body in anticipation of recent researches in that direction, and he has also made interesting contributions to the study of the nervous system. John C. Dalton has published original and valuable observations relating to the nervous system, digestion, the functions of glands, and other physiological subjects. To him is due the credit of the introduction of vivisections into physiological teaching, which important mode of illustration is probably practiced in certain of our medical schools more largely than in those of Europe. S. Weir Mitchell has developed important facts in relation to the nervous system. Austin Flint, Jun., has contributed new views re-

specting circulation and respiration, together with experimental researches relating to a new function of the liver. The latter received honorable mention by the French Academy of Sciences, with a recompense of 1500 francs. Brown-Séquard, Dalton, and Flint junior have contributed largely to physiological literature.

It remains to consider briefly medical and sanitary progress as exemplified by mutations in the practice of medicine. It is a curious fact that, according to a wide-spread popular belief, physicians of the present day hold strictly to doctrines handed down by Hippocrates, Galen, and others of the early fathers in medicine. These ancient doctrines, it is by many supposed, have with the medical profession somewhat of the force exerted by theological dogmas on their adherents. The practice of medicine is thought to embrace a binding creed, from which physicians are expected not to swerve under the penalty of being repudiated by their brethren. Hence it is common to speak of a medical man as belonging to the "old school." I say this is a curious fact, for quite the reverse is the truth. The past history of medicine shows a series of mutations in its principles and practice. It is far more open to attack on the score of successive changes than of fixedness. The illegitimate systems which from time to time have sprung up are distinguished by being based on particular dogmas. Their followers are truly sectarians. There is no other standard for medical orthodoxy than the opinions held by the reputable physicians and inculcated in the accredited works. As regards individual opinions and modes of practice, so long as they are not maintained in a sectarian spirit nor adopted for unworthy ends, there are no restrictions in the way of professional fellowship. The views of a physician, theoretical or practical, may be never so eccentric or absurd without interference with his fraternal relations, provided he conforms to the established principles of medical ethics, and does not place himself in an attitude of antagonism toward the honor and dignity of the profession.

A comparison of the early and latter part of the last centennial period furnishes many striking points of contrast. Of course it can not be expected in this paper to go into details; I must confine myself to leading characteristics. A very marked contrast relates to the use of certain potential measures of treatment, such as blood-letting, cathartics, emetics, blisters, or other methods of counter-irritation, the use of mercurial remedies, etc. Comparatively these are but little employed at the present time. This therapeutical change is by no means proof that these measures are not useful. Their usefulness has heretofore undoubtedly in many instances been overestimated, and it is not improbable that further progress in medical experience will show that they are now underestimated. One reason for their being used with more circumspection and reserve is, the ends for which they were employed, owing to improvements in *materia medica* and pharmacy, are now accomplished by remedies which involve less repugnance on the part of the patient, and which are less liable to do harm if injudiciously employed. In this point of view, therefore, the change denotes progress in knowledge. Perhaps nowhere more than in this country is the practice of medicine characterized by the change just adverted to.

Potential drugs of all kinds are less used now than heretofore. This is due in a measure to a better knowledge than formerly of their operation, acquired by accumulated clinical experience and experiments on the lower animals. But it is in a great measure attributable to the results of the study within late years of the natural history of diseases. This term embraces the laws regulating the termination, the duration, the phenomena, and the complications of diseases, irrespective of the operation of active measures of treatment. The importance of this study has been for the past half century more appreciated than formerly. As opportunities have offered, it has been prosecuted with much zeal and patience. Physicians in this country have taken not an insignificant part in the prosecution of this study. The results have shown that many diseases are self-limited in duration, and pursue a favorable course without active medicinal interference, and, as a consequence, there is a greater reserve now than heretofore in the use of potential drugs. And in proportion to this reserve a greater importance has been attached to what may be distinguished as sanitary measures of treatment, such as ventilation, regulation of temperature, etc. It is undoubtedly true that many diseases are more successfully managed on account of these changes. In the dietetic management of the sick there has been great improvement. The recognition of the importance of supporting the powers of life by an adequate alimentation, together with the judicious use of alcoholic stimulants, is one of the striking characteristics of progress in the practice of medicine during the last half century. In all these mutations indicative of progress, it may be claimed, in behalf of the medical profession of this country, that they have not been backward in conforming to them nor in promoting them. The American medical mind may be said to be eminently cosmopolitan and eclectic. With perhaps some undue readiness in accepting opinions emanating from abroad, the prevailing disposition is to seek every where for new developments of knowledge, especially in the practical departments of med-

icine. In this country, as elsewhere, one point of contrast between the present and the past is the diminished power of individual authority in medical doctrines. At this day, much less than in former times, is the phrase, *Jurare in verba magistri*, applicable to the medical profession.

In the preparation of remedies there is a notable contrast between the earlier and later portions of the last centennial period. The improvements in pharmacy have been very great. Concentrated forms of medicine have largely supplanted infusions or decoctions and bulky medicinal substances. The discovery of the alkaloid quinia was in 1820. Previously malarial fevers were treated with the powdered cinchona bark, the quantity requisite for a cure being so large that, on this account, the treatment was very often unsuccessful. Let it be considered that pounds of the bark are represented by a few grains of the alkaloid. Quinia was speedily after its discovery in use in America, where malarial fevers were a great obstacle in the way of the settlement of our vast national domain. As early as 1841 it had been employed in doses which had not been ventured upon in Europe, but which since that time have been found essential to secure its full remedial power, not only in malarial fevers, but in other diseases. The experience in our country did much toward developing knowledge respecting the curative power of this great antiperiodic remedy.

In the manufacture and employment of other isolated medicinal principles from vegetable remedies, and of extracts, the pharmaceutists and physicians in this country have not been far behind those of Europe. To appreciate the progress in this regard, from the stand-point of the patient, one must be able to recall the time when the nauseousness of physic could not fail to tempt many to throw it to the dogs. Thanks to pharmaceutical improvements, doses of medicine are now rarely disagreeable, and not unfrequently they are even rendered palatable.

Passing from this brief reference to mutations in practice to the character of the medical profession, as represented by the average of the professional attainments, together with the intellectual and moral qualifications of its members, it is needless to say that the progress has been marked. In these respects the medical profession in the United States to-day will compare favorably with the profession in any part of the world. This may be asserted without presumption. It would be easy to cite the testimony to that effect of competent observers from abroad who have been among us. Nowhere in civilized countries do medical men hold a higher social position than here. Nowhere, as a class, do they exert a stronger influence upon other members of society. In our democratic form of government no body of men are more influential. Were the physicians of any of the States in the Union to combine together to form a political party, their power would be irresistible. With such a combination, the election of officers and law-makers would be under their control. Fortunately, or unfortunately, this is not likely to happen, for, as a rule, physicians are not inclined to take an active part in politics. By those who might deprecate a political party composed of doctors it will doubtless be said, such a union is rendered impossible by their proverbial tendency to disagree. The disagreement of doctors has long been a proverb. They are considered fair game for jests in this regard. Were the charge made in earnest, it would be out of place in this article to undertake to refute it. Of the three professions, the imputation, even in jest, would hardly come with a good grace from the clergy. Our legal friends are sometimes fond of comparing, in this point of view, the medical profession with their own. If any of these should honor this article by a perusal, I am sure they will not take offense if I introduce an anecdote which, as I hope, will not be considered frivolous or out of taste in treating of so sober a subject as medical and sanitary progress. The anecdote was told by an eminent member of the bar in Connecticut, who was a party in the colloquy, and who related it, by-the-way, as evidence that a talent for humor which formerly was possessed by not a few physicians had nearly become extinct, the profession in this respect having retrograded rather than advanced. This distinguished lawyer, meeting one day an old physician of the humoristical school, in order to elicit a witty rejoinder attacked him on the score of the disagreement of doctors, referring, in contrast, to the habitual agreement of lawyers, no matter how violently they opposed each other in their professional antagonism. He asked his friend the doctor to explain this contrast. "Oh," said the doctor, "Milton has given the explanation of the difference between us in this respect in the following quotation:

> "'Devils with devils damn'd firm concord hold;
> Men only disagree.'"

The proper scope of this article takes in only the past; but anticipations naturally follow retrospections. After a review of the progress made during the last hundred years, one can hardly forbear to ask, what will have taken place at the end of the next centennial period? A few thoughts suggested by this question may be permitted in concluding the article. It is quite certain that medical and sanitary progress will continue. This is a fair inference from the continued progress hitherto up to this time.

It is also a logical conclusion, from the facts in the past history of medicine, that future progress in this direction will be by slow advances. As it has been heretofore, so it will be hereafter: great discoveries or improvements will not follow in rapid succession. The great event in the seventeenth century was the discovery of the circulation of the blood, in the eighteenth century the discovery of vaccination, and in the present century the discovery of anæsthesia. Events like these are not to be expected to recur at much shorter intervals. What is to be the next great event? It would, of course, be absurd to attempt to answer this inquiry. Sometimes, however, preliminary circumstances, as we can see afterward, have pointed distinctly to the direction in which a great discovery was to be looked for. If I were to indulge a prophetic fancy, it would lead me to predict that, ere long, the nature of what are called the special or specific causes of disease will be demonstrated. By special causes I mean those which produce certain diseases, such as the continued, the periodical, and the eruptive fevers. That these and some other diseases have each its own special cause, never occurring without the action of its own cause, and the latter producing only that particular disease, is rationally almost certain. We are acquainted with many of the conditions under which these causes are developed, and we know many of the laws of their operation; but their nature has not been ascertained. It is easy to imagine that were these causes fully known, a great impetus would be given to the progress of medicine. The discovery of the nature of one special cause would probably lead, by analogy, to a similar knowledge of the other causes. It may reasonably be supposed that the knowledge of their essential nature would lead to the means of destroying them, or of neutralizing their morbific operation, and in this way the most destructive to human life of the acute diseases would be prevented or arrested. Many circumstances combine to render it probable that these special causes are either vegetable or animal organisms. On these circumstances are based the "germ theory" of disease. It is, indeed, claimed by some that the causation of certain diseases by specific organisms of microscopical minuteness has been demonstrated; by the majority of medical thinkers, however, the demonstrative evidence is not considered as complete. It is an interesting fact that a quarter of a century ago the cryptogamic origin of many diseases was advocated with cogent evidence and argument by a distinguished medical teacher in this country—the late J. R. Mitchell.

Judging from the past, the future progress of medicine will involve improvements of and additions to the means of investigating the body in health and disease. Within the present century the different organs were resolved into their component tissues by differences mainly in sensible properties. In this way Bichat created the department of general anatomy, that is, the description of the elementary tissues into which the organs are resolvable. Next came the application of analytical chemistry to the study of the solids and fluids, by means of which the department of general anatomy was extended. Then followed the employment of the microscope, giving rise to a new province in anatomy and pathology, namely, histology. Meanwhile the investigation of the heart and lungs by means of the conduction of sounds engaged attention, and auscultation became a branch of medicine. Still later the exploration of the interior of the eye and of the air passages by means of optical instruments has given rise to ophthalmoscopy and laryngoscopy. To these might be added numerous improved methods of examining internal parts by manual instruments.

The improved and added means of investigation which are in the future can not be foreseen, but it may be hoped that thereby, before the lapse of another hundred years, will be gained an insight into the molecular processes involved in nutrition, secretion, and excretion. At present our knowledge of these processes is limited to the conditions under which they take place, with certain of their laws and their effects. In proportion as they are more fully understood, the processes involved in inflammation, the various morbid alterations of structure, and the disorders of glandular organs may be expected to be better comprehended, contributing, moreover, to the progress of therapeutics as well as of pathology, and changing materially the principles and practice of medicine.

If, as regards new remedies and improvements in pharmacy, progress continue as it has taken place in the past, the present may very imperfectly represent the future treatment of diseases. It is but a little over half a century since the great antiperiodic remedy, quinia, was discovered. It is not improbable that before the end of another half century a remedy, or remedies, may be discovered which will arrest other fevers or acute inflammatory affections as quinia arrests malarial diseases. If such an event take place, how great will be the change in practical medicine! New modes of introducing remedies into the system may be ascertained more effective than the recently employed method of injecting medicated solutions beneath the skin.

The extent to which abnormal conditions of the mind are dependent on morbid states of the body is hardly yet fully recognized, though it has been the subject of much

thought. Mental disorders falling short of insanity have hitherto entered too little into pathological study. The time may come when, with a better knowledge of the mutual relations of the mental and vital functions, disorders of the former, now in a great measure left for "the patient to minister to himself," will be prevented or successfully treated, and the development of insanity thereby often forestalled. With future progress in this direction, it may be that not a little of the abnormities and enormities which the law considers and punishes as crimes will be recognized as more properly belonging to pathology, claiming the judicious management of the physician rather than judicial treatment.

Finally, the spirit of imaginary foresight which has led to the few foregoing thoughts suggests the question, how will the coming physician differ from the physician of to-day? The question gives rise to a train of speculation which it would be pleasant enough on the part of the writer to pursue; but this I must forego. Suffice it to say that the coming physician will not be regarded even as much as now in the light of a mere prescriber of drugs. I would by no means be thought to underrate the importance of this function. Diseases will always claim medicinal treatment, and doubtless medicines will be prescribed a hundred years hence with more efficacy than in the present stage of medical progress. But the coming physician will be regarded in a higher point of view, as one on whose judgment people will be content to rely in the interdiction as well as in the prescribing of drugs. It will be more and more considered that one of the most important of his professional functions is to determine, by skilled interrogation of the different organs of the body, their freedom from disease, as well as, on the other hand, to detect accurately and early deviations from health. He will himself appreciate more and more the fact that prophylaxis—the prevention of disease—is a higher and more useful branch of medicine than therapeutics. The prevention of crime and the proper treatment of criminals will be recognized as embraced within the scope of medical knowledge and practice. His offices as a hygienic adviser in matters pertaining to mind and body will become equal, if not superior, to his duties as a therapeutist; and the future enlightened lawgiver, with "others in authority," will co-operate in devising and carrying out measures for medical education, the promotion of medical knowledge, and those having reference to public health.

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NEW YORK.

"THE POET."

THE mute gods sent him hither;
But had he been untrue,
Or was he banished thither
Before his beauty grew,
Afeared their own should wither,
Only the mute gods knew.

Earth sent her June to meet him;
And what could Earth do more?
The daisies sprang to greet him
Upon her threshold floor,
And the star-shine did entreat him
When Day had given o'er.

She set her fountains springing
To lull him from desire;
Sea winds and waltzes ringing,
The Lorelei with her lyre,
And the sea winds and the singing
Forbade him to aspire.

But the whitest, sweetest daisies
Grow in remembered bowers,
And in the moonlight mazes
He dreamed of hills and towers,
Seen dimly through these hazes,
Of bolder reach than ours.

Pleasure bent low to woo him,
In beauty unconfined;
Fame, looking backward, threw him
Her smile of bitter kind;
And Power did stoop to sue him
With eyes that loose or bind.

But what were Power or Pleasure
To him whose memory heard
The throbbings of a measure
By which the gods are stirred—
Whose longing left no leisure
For Fame's supremest word?

Our Life was but a dreaming
That bound his eager eyes;
And all Earth's glorious seeming,
Her waves and tender skies,
Veiled sadly, to his deeming,
Some more divine surprise,

Till one unhoped-for dawning
Love caught the veil away.
Above the grand mouth's scorning
She set her smile for aye,
And the evening and the morning
Shut in a perfect day.

The meaning of the roses,
And the harmony of rain,
Which but to Love uncloses,
Grew sudden sweet and plain.
No god, he said, deposes
Whom Love hath crowned again.

But the mute gods, all unfrowning,
Loosed down through worlds ajar
A jewel for the crowning
Immortals call a star;
'Tis Pain in mortal owning—
And the mute gods smile afar.