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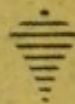
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MEDICINE AS A CAREER FOR EDUCATED MEN



The Commencement
Address at Lafayette College
June 13, 1893



BY WILLIAM W. KEEN, M. D., LL.D.
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MEDICINE AS A CAREER FOR EDUCATED MEN.

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BEAUTIFUL for situation, the joy of the whole earth," was the description of ancient Jerusalem by its enthusiastic admirer. And surely any one looking on Pardee Hall would be justified in applying this encomium to Lafayette College. It is a genuine pleasure to me to join with you in your annual festival when your tribes come up to their intellectual Jerusalem, "singing their songs of degrees" as of old. And although the son of another academic mother, I rejoice with you in the prosperity and glories of your noble college. I see around me old men, graduates of the forties, with silvered heads, their paths in life chosen, their duties fulfilled, their lives culminating in honored, cultivated leisure and wide influence, whose achievements are recorded in the history of the world of art, science, literature, language, business and religion. I see again men in middle life, graduates of the sixties and seventies, alert for every opening for the best work in the world's great enterprises. They are in the fore-front of the fight against ignorance, vice, and irreligion.

But it is rather to the young men, and especially to you, gentlemen of the graduating class, who are now taking leave of these classic shades where you have spent the four most blissful and fruitful years of a man's life, to which he ever reverts as the halcyon days of youth—to you that I especially address myself. The joys, the trials, the studies, the achievements of your college life are now, or soon will be, over. The world stands open before you. "What shall I do?" is the question of questions to you. The decision of this question may make or mar you.

If you decide rightly you will achieve success, honor, happiness, and the final consolation of a life well and nobly spent. If wrongly, your decision may wreck, even hopelessly, a young life full of brilliant promise. You and your fellows in the many colleges of the land who will graduate in this leafy June have on your side youth with all its potencies. You have a just and laudable ambition. You are ready to work your finger nails off. You have trained intellects. You are members of the true aristocracy of learning, men of marshalled forces, the hope of the nation, the future natural leaders of thought in public and in private life. What shall you do? "Surely," says Carlyle in his Biography of John Stirling, "the young heroic soul entering on life so opulent, full of sunny hope, of noble valor, and divine intention, is tragical as well as beautiful to us."

It is of equal importance to the community as well as to you that you elect wisely what path you will follow in this busy world. Some of you will enter commercial life, lured possibly by hopes of material reward. Some may be devoted to art with its æsthetic enjoyments. Some will find in literature the contentment and fame that come to the successful author. Some will devote their lives to the highest human function and service to their fellow men, in winning them to Christ-like lives and heavenly aspirations. Some will seek the noble profession of the law and will become leaders of the bar and wear the ermine on the bench. Not a few, I hope, will devote yourselves to a scientific career with, it is true, its ceaseless toil, but also its fascinating investigations, its splendid discoveries, its beneficent inventions.

It is my desire to lay before you some of the rewards, the possibilities, the attractions of such a scientific life, and to win you to its pursuits, since it has attractions, wonderful attractions, from many sides and for every type of man, excepting always the lazy. I have selected as my topic, therefore, "Medicine as a Career for Educated Men."

I am met at the outset by the query, "Are there not already

too many doctors?" Yes; far too many poor doctors, but far too few good ones. Webster's oft-quoted remark that "there is plenty of room at the top" is as true of medicine as of any other profession. In any profession there is always a reserved seat in the front row for a March, a Faraday, a Schliemann, a John Hunter, a Lister, a Virchow, a Pasteur, a Gross. And although no one of you may become the peer of those I have named—and yet why should you not?—still there is always room right next to them for the trained intellects who will make their profession an integral part of their lives and devote themselves earnestly and truly to its pursuit. Never has there been such a demand in medicine for men of the highest type, the deepest insight, the profoundest spirit of investigation. Never have there been so many questions of grave import to the human race awaiting solution. The mighty problems of life and disease and death crowd upon us and await the touch of a master hand to make the obscure clear, to avert the dire results of accident, to stay the hand of the Angel of Death and say in dominant tones, "Thus far and no farther."

Medicine is looking to just such well-equipped, thoroughly trained men as you for its champions in this daily fight with death. And if you wish to rise above the dull level of mediocrity it will be to you college men that the renown which is the proper object of a laudable ambition will surely come. President Thwing in the June *Forum* states that Appleton's *Encyclopedia of American Biography* contains the names of 912 doctors of whom 473 were college-bred men. The *Medical Record*, commenting upon this fact, estimates that 300,000 men have started out in medicine in this country during the present century. If so, the chance of the ordinary doctor's becoming famous is about one in 300. But if he be a college-bred man it is about one in six. The profession, as I have said, is filled to repletion with poor men and untrained men. What we want is the men fresh from the laboratories of the best colleges, men whose minds are trained in logical methods, who

are versed in the "humanities," who possess refinement and culture, who, having eyes and ears, have learned to use them to the best advantage. In that delightful book, "The Gold-Headed Cane," Radcliffe—him of the library—visits Mead in his library and says: "As I have grown older, every year of my life has convinced me more and more of the value of the education of the scholar and the gentleman to the thoroughbred physician. Perhaps your friend there (pointing to a volume of Celsus) expresses my meaning better than I can myself when he says that this discipline of the mind, '*quamvis non faciat medicum, aptiorem tamen medicinæ reddit.*' "

The signs of the times point to a closer affiliation of colleges and medical schools, which will be equally advantageous to both. Five years ago nearly all the medical schools in this country were two-year schools. Now nearly all have the three-year courses and a few four, and the new Pennsylvania law requires four years of study, of which three shall be in a medical school. This movement in the direction of a more thorough education means that the medical schools desire to offer a curriculum worthy to attract the best educated men. Moreover, the medical schools are endeavoring to adjust their courses so that they will be the natural continuation of the college courses. Without sacrificing the symmetry and completeness of the college curriculum or abridging the studies for the medical degree, their aim is so to adjust the two that they shall be linked together as one complete whole. Thus many of the medical schools are considering what means can be adopted to draw into affiliation with them the colleges and college men in preference to others. The larger development of the Jefferson Medical College, of the medical departments of Harvard University, of the University of Michigan, of the University of Pennsylvania, and of Johns Hopkins, are evidences of the same wish to win the college men to a medical career. The union of the College of Physicians and Surgeons with Columbia College as its medical department, and the projected absorption of one or more of

the Chicago medical schools into the University of Chicago show the same tendency. Moreover, the colleges are looking equally toward the medical schools, as I have pointed out, by the establishment of courses which will naturally lead up to medicine. In Brown University the same movement is actively taking shape through the Brown University Medical Association, and in several universities with medical departments similar steps have already been taken. It is a movement full of promise.

If any of you look forward to medicine as a career you should view it from three different standpoints. First on its economic side. This is a matter of no little importance, for every man in this world must earn his living and also naturally looks forward to the support, not only of himself, but of his wife and children in the future. No one should expect in medicine to make a fortune. A few doctors do so, but they are the exception. But every man who enters medicine, if he will be faithful and honest in his work, and *a fortiori* the more intellectual college man, can be sure of a competence, nay more, can be sure that he will enjoy not only the reasonable reward of toil, but be able to lay up sufficient for his own old age and for his family.

Secondly, a much more elevating and attractive side is the philanthropic or humanitarian. The medicine of the future will be chiefly in the direction of that most philanthropic object, the prevention rather than the cure of disease. Hygiene or Preventive Medicine has only arisen within the last forty years. It has already done much, but it promises far more. If it is necessary to show that the knowledge of hygiene is still limited, look at the recent reports on the sources of the water supply of New York. Nay, you need only go into the slums of your own city; or if you live in the more God-blessed country you may find a startling ignorance of the laws of health in almost every farm house. Nay more, you need only cross-question a half dozen of your intimate friends as to their modes of life to discover that the laws of hygiene are "more honored in the breach than the observance."

That there is ample room for missionary work in the matter of personal cleanliness alone will be evident from two recent incidents in my clinics at St. Agnes and the Orthopedic Hospitals. At the former, as I uncovered the feet of a woman to examine them in consequence of an accident, I was startled at their condition and asked her when she had had a bath. "And phwat's that?" was the innocent reply. At the latter, last winter, after examining the spine of a young lady of sixteen, the daughter of a respectable farmer, I said to the parents with a bluntness born of indignant surprise, "It must be a long time since your daughter has had a bath?" "Why yes," said her father, "I don't believe she has been in a tub in a year." To which his indignant wife replied, "Why of course she has, John. Don't you remember that bath she took last summer?" They probably agree with a witty medical friend who seriously avers that "everybody ought to take a bath once a year whether he needs it or not."

A recent census of a portion of the Chicago slum district also has disclosed the fact that in a population of 16,000 there were but *four bath tubs* and two of these were disconnected from the water supply! The entire community suffers from such indecency, uncleanness and necessary ill health of a part.

What a fruitful field there is in hygiene both for scientific and benevolent teaching as to plumbing, drainage, ventilation, clothing, food, drink, city architecture, city streets and sewage, city water supply and the eradication of all the evil influences which confront us, both in country, and especially in city life. Many diseases are now recognized as preventable, if the community were only alive to the necessity and the possibility of their prevention. "For every case of typhoid fever," it has been said "somebody ought to be hung"—a rough and epigrammatic way of stating what is undoubtedly true, that in a perfectly regulated community there would be no typhoid fever.

But besides such public benevolent service, there is a personal philanthropic side of medical life, to which I gladly advert. Picture to yourself the daily life of the doctor. It has undoubt-

edly its trials, many and great. The humdrum recital of ancient aches and pains sometimes becomes irksome by repetition. The doctor has patients upon whom he has bestowed unremitting care and his very best mental and physical powers, who have proved ungrateful and have even become his foes. He does an immense amount of unrequited service. His nights are disturbed, his days are not his own, of his family and friends he sees but little. But then, what calling does not have its trials? In what life is there not friction, which, as in mechanics, should be allowed for, and not permitted to become a source of irritation and annoyance? But in spite of all these trials, the doctor's life is so rich in its personal rewards, in its humane service, that it ought to be to him a daily joy.

There is to him a daily personal growth in knowledge. Every sickroom is a schoolroom, and every case a lesson, from which he comes a larger man. There is a daily personal growth in character, so that he should lie down each night a better man. There is a daily personal growth in his power to do good, which should be at once a reward of past work, and a stimulus to better. There is a daily personal growth in the friendships and esteems of life, which constitute one of the most delightful rewards of the doctor. What greater joy can there be in life than to go about among one's fellow men carrying with him, as the doctor does, an atmosphere of comfort, of hope, of courage, of health.

There come to him, constantly, cases in which disease challenges him to combat. It says to him, as it were, "Catch me if you can, in all my devious wanderings and unexpected disguises;" and there is a mental exhilaration in following every turn in the trail and running to earth the fleeing goblin, which is captivating to every inquiring mind.

Look for a moment at the methods of the careful, intelligent doctor, as he investigates such a case. First, he inquires with care into the family history for lurking influences of evil heredity. Next, into the personal history, not only the physical history of the patient from his birth, but the influences of his environment,

his habits, his hours of rest, his methods of labor, his physical and mental virtues and vices. Then follows the history of his present illness, including all his symptoms, the examination of his secretions and excretions, the shrewd judgment which eliminates the unessential and often the inaccurate or imaginative statements from those which are real and essential. Then too, he must not forget the influence of mental states; of worry, of family trouble, of personal trials. Next he passes to the physical examination of his patient, when his eye must be as keen as that of an eagle, his touch deft and delicate in estimating size, consistency, elasticity, and other physical conditions. He must then co-ordinate all the so far disjointed facts with a mental acumen and logical method which, at first laborious, becomes afterward comparatively easy if he has been faithful and thorough in his earlier investigations. By these means he reaches a diagnosis and settles definitely upon the medical or surgical treatment. Each case is then a study in physics, anatomy, physiology, pathology, psychology, chemistry, therapeutics. In the vast majority of cases he is rewarded by seeing returning health. Sir Spencer Wells as the net result of his first 1,000 ovariectomies added 20,000 years to human life, and so far has modern surgery surpassed this result that every thousand similar operations to-day add not less than 30,000 years to human life! Think what one of these lives means, as the pale cheek regains its color, the feeble pulse its force, strength succeeds weakness, each day records a gain, and finally health is re-established. The tender father returns to his usual pursuits; the adored mother once more becomes the center of loving care of her family; the beloved child is restored to the family circle with ruddy health, rescued from the valley of the shadow of death itself. The hushed voices, the soft tread of the sick room have given place to the laughter of health, the mists of sorrow are driven away, the anxious alarms of disease have vanished. What, think you, can equal the joy of the physician, as he views this happy transformation? Who is a dearer, more cherished, more welcome

friend than he? Who finds a warmer place by the fireside and in the very hearts of his patients? No one can adequately appreciate his profound joy, his daily delight, his deep gratitude to the "Giver of every good and perfect gift." Oh, my friends, it is a blessed profession, a divine calling, with a heavenly recompense on earth.

But sometimes death must come. Even here, however, the kind and sympathetic physician finds his place. Who can so tenderly guide the poor sufferer to his long rest, so gently assuage the pain of the dying? Who so endears himself to broken hearts in the hour of their bitter extremity as the strong yet tender Christian physician? Often, even death makes for us our dearest, most loving friends, who would pass through fire and water for us.

Even its dangers are an attraction akin to those which draw the hardy mountaineer toward the dizzy heights of the Matterhorn. And when to these dangers is added, in times of pestilence, the clarion call of duty to his fellow man, where has there been a recreant doctor? Point out the renegade if you can! The gallant Six Hundred who rode into the Valley of Death were no braver than the unsung heroes of Norfolk or of Hamburg. I glory in my profession that in such hours of peril it has known no cowards; the meanest soldier in its ranks has been a brave, unselfish, devoted hero, and oftentimes a faithful, gentle martyr dying at his post of duty.

But besides the economic and the philanthropic side, medicine has thirdly its splendid scientific aspect which fuses with both of the others, and yet may be regarded separately from them. Let me point out some of the best achievements and present problems of medicine. The present century has seen vast strides in every department of medicine. I will not weary you by mentioning the immense improvements made in many minor details which would be more suited to a technical audience, but it is proper that I should allude to three brilliant discoveries which stand out prominently as of the first magnitude.

First, the discovery of anesthetics. The beneficent results from this discovery are so well known that I need only call attention to them and also note in passing that the three principal anesthetics, ether, chloroform, and nitrous oxide, are American either by discovery, or by introduction into general use.

The second great achievement is the antiseptic method by one of our cousins across the sea, the justly immortal Sir Joseph Lister. While anesthetics have been an immense boon, especially in the domain of surgery, antiseptics have saved countless lives and untold suffering. The method is so recent that I have seen both its birth and its development. In our late war and for ten years after its close every wound and every operation was followed as a matter of course by fever and more or less suppuration, or the formation of "matter," which in a multitude of cases resulted in blood-poisoning, erysipelas, hospital gangrene, lock-jaw, and a hundred other kindred evils from this Pandora's box. Now, however, we are enabled to perform any one of the ordinary operations, such as amputations, ligations of the great blood-vessels, the extirpation of tumors and the like with almost absolute safety, and this surgical safety has emboldened us to perform many operations undreamed of even by an Astley Cooper, a Nélaton, or a Pancoast. The great cavities of the body, the head, the abdomen, the pelvis, and even the chest are invaded with a sense of security and an almost absolute certainty of recovery which would have astounded our fathers. Amputations which were formerly attended with a mortality of nearly fifty per cent. are now so free from danger that we always expect our patients to recover and are chagrined if they do not. Compound fractures, which twenty years ago often had a mortality of over sixty per cent., now scarcely occasion any anxiety, and ovariectomy, formerly a most dangerous operation, the rise of which I can well remember, has now a mortality of only ten, five, and even three per cent.

The third great discovery of the century is the new science of

Bacteriology, a child as yet in its teens. It arose when many of my younger auditors were discarding their knickerbockers for trousers. That minute organisms or germs were the cause of very many diseases had long been suspected, but until twelve years ago we were not at all certain that the process of inflammation and the formation of matter or pus, or that many well known diseases were the result of such germs. Now we know not only that they are the cause of all inflammation, but scientific investigation has shown us that all suppuration, pneumonia, lock-jaw, diphtheria, erysipelas, leprosy, tuberculosis, and a host of other diseases are due to these minute vegetable germs. You can easily understand that only the first elementary facts have been ascertained and by no means all of these. Here is a whole new science awaiting patient investigation and brilliant discovery. Who that has ambition and enthusiasm is not aroused by such a prospect?

How is it that these minute germs produce their malign influences? We know that they secrete or in some way produce certain deleterious poisons in the human body, but how these or the bacteria act we do not know. When we learn just how they act, in all probability we shall be able soon to discover the means of counteracting their harmful effects. The problem how to destroy the bacteria without destroying the patient is one which we have not yet solved. We know that they produce infection. We know fairly well how to prevent their entrance into the body in surgical cases by the careful antiseptic cleansing of the person of the patient, of the instruments, sponges, dressings, hands, everything which comes in contact with the wound. But in many instances cases are brought to us already infected. A man who has met with any accident has an infected wound, and if any time has elapsed his system has become infected. We are as yet groping for methods by which we can surely overcome such a previously established infection. Here, you see, is another field for scientific activity and the most beneficent results.

We are learning how to prevent typhoid fever, tuberculosis, and other medical diseases, but have not even yet begun to learn how to prevent the entrance into the system of the bacteria of pneumonia, influenza, and other similar diseases.

Again, there are certain half-discovered facts which already give us glimpses of unsuspected triumphs. Within the last few years it has been found by experiments on animals that the germs of certain diseases when inoculated, for instance in a rabbit, from that to a second, a third, and so on, become intensified in their action; whereas if similarly inoculated in one monkey after another they become diluted and weakened in their action. How or why does the virus or germ become stronger by transmission through a series of rabbits and weaker in its transmission through monkeys? How can we utilize this for the benefit of humanity? Here is another problem awaiting its Newton or its Morse.

Again, we know that there are animals in which we cannot produce certain diseases. For instance, the attempt has been made scores of times to inoculate cancer into the lower animals without success. They do not suffer from measles or scarlet fever, whooping cough or mumps. There are also diseases peculiar to certain animals which man does not take. We know very well that there are some human diseases from which certain persons are exempt. For instance, people have grown up from childhood, been exposed to scarlet fever, or measles, or small-pox, and yet have not taken it. These animals or people have what we call a "natural immunity" to these diseases. Thus far preventive medicine has only attacked one disease in the way of producing an artificial or "acquired immunity." This is vaccination by which immunity against small-pox is produced; or, in other words, a vaccinated person can be exposed repeatedly even in epidemics of small-pox without contracting the disease. With such a striking example before us for over a century, how strange it is that it did not suggest experiments in the same direction in other diseases.

But at last this hint has been taken and it promises much in the future. For instance, it has been discovered that if we inoculate an animal with the germ of lock-jaw, the most virulent of all bacteria, and then take the watery part of the animal's blood—the blood serum—and inoculate another animal with it, the second animal may then be inoculated with the germ of lock-jaw without becoming the victim of the disease; in other words, in the second animal there has been produced an acquired "immunity" against the disease. Even if the lock-jaw had already attacked the second animal, this blood-serum, it was found, would vanquish the disease. Here we come to one of the most striking recent results of scientific investigation. Once that it had been tried sufficiently often to determine that this mode of conferring immunity or of arresting the disease was not deleterious to the animal, it was deemed right that the same attempt should be made in man to cure this dreadful disease, and within the last three or four years there have been recorded nearly a score of cases in which patients suffering from violent attacks of lock-jaw have been cured by inoculation with the blood-serum from such an animal. This immunity or cure is supposed to come from some antidote, or, as it is called, "antitoxin," produced in the first inoculated animal and introduced into the body of the second animal or of man with the blood-serum. Think you that it will be no great service to humanity, no great scientific feat, which will fill one's mind with a wondering, never-ending satisfaction, and crown his life with fame, when this problem is fully solved? What extraordinary results it may lead to we can as yet only guess at, but its possibilities seem magnificent. At this very moment Dr. Haffkine is in India inoculating people with the antitoxin of cholera and bids fair to succeed in his efforts to limit or prevent this fearful plague.

You have all heard, of course, of Koch's tuberculin. This consists of a modification of the ptomaines or poisons produced by the little bacillus or germ which causes tuberculosis or con-

sumption. You know how the discovery was prematurely announced and heralded by the newspapers and then fell into disuse, and has been the object both of obloquy and ridicule. As a matter of fact, it is still being used in other modified forms by physicians and surgeons, and it is not too much to say that we have gone a long way towards finding the means by which we shall probably within the next few years cure consumption and all the other baleful effects which follow from tuberculosis. And when I tell you that there is not an organ in the body which is not affected by tuberculosis, and that it is the cause of far more suffering and more deaths than any other disease, you will appreciate the immense boon its cure will be.

And please note that these instances which I have given of lock-jaw and of cholera and of consumption are but types of a series of investigations in the antitoxins or natural antidotes. This opens the door to a wholly new class of remedies furnished by our very foes, on which a large number of experiments are being constantly made.

The fearful ravages of cancer are familiar to all. Its cause is unknown, its cure compassed only by its early extirpation, and even then, I must regretfully confess, but rarely. But within the last year research has seemed to show that we are on the verge of the discovery of its cause, and if so, time will give us its cure. Who of you would not rather make such a discovery than be the father of the Atlantic cable or the successful general of a great war? Who would be so blessed by future millions of mankind as the discoverer of such a boon to the whole race?

Within the last two years also another class of remedies has been introduced, especially in connection with a disease with which you are probably not familiar, known as myxœdema. You all doubtless are aware what goitre is. Until lately it was scarcely deemed amenable to operation, but modern surgical methods have so improved that several hundreds of cases have been reported in which the goitre has been removed, and the patients have nearly all recovered. But after these operations a

curious and unexpected result was found. Goitre consists in the enlargement of a certain gland in the neck called the thyroid gland. If the whole of this gland either in health or disease is removed, a considerable proportion of such patients undergo a sort of elephantine growth all over the body. The features become thick and clumsy, the fingers and toes swell to twice or thrice their ordinary size. The mental condition also degenerates into a form of cretinism. This misfortune attending the complete removal of the gland led, first to a modification of the operation, viz., the partial instead of the total removal of the gland; even a little of the gland if left, it was found, would prevent such a bad result. But it has done more than this. Victor Horsley, in England, suggested that in cases in which, as sometimes occurs, this disease myxoedema, arose spontaneously, the thyroid gland itself might be used as its best remedy. Accordingly first it was used surgically. The thyroid gland was removed from a sheep and transplanted under the skin or into the abdominal cavity of the patient. It grew there and so long as it remained the patient was bettered; but experience showed that the gland soon disappeared and the betterment vanished with it. Then an extract was prepared from the gland and used hypodermatically. This gave still better results, but it was suggested again that if the patient were simply fed on the gland itself (it is one of the sweetbreads of the body) cure might follow; and within the past year a large number of cases have been reported which have been cured by this wholly new method of treatment. See then here another fruitful field of research in the administration of various remedies derived from particular glands or other structures in the animal body. Already such an extract from the brain has been used in epilepsy, but it is too early as yet to say whether the result will prove to be good or not. Within a month, Vaughn of Ann Arbor has also called attention to the fact that the extract of the thyroid and other glands is fatal to bacteria. This new discovery may lead to the most beneficial results.

But what we do not know in bacteriology is far, far greater than what we do know. The bacteria of scarlet fever, of measles, of small pox, of whooping cough, of typhus fever, rabies, and many other diseases are as yet unknown and awaiting your touch, your investigation. If you miss your chance, others will seize it.

If I were to ask any one of you whether Anatomy, Physiology, and Chemistry are comparatively complete sciences, I suppose you would answer unhesitatingly, yes. On the contrary, they are most incomplete. We know to a fair extent the gross anatomy of the human body, although even here there is an immense deal to be learned; but the minute anatomy is not well known, and there is scarcely an organ in the body whose physiology has been half studied. Even so common a substance as the white of an egg has defied the chemists, and the analysis of ninety-five per cent. of the solids of the body is imperfect. Yet this is fundamental Physiological Chemistry.

When I first taught anatomy, the great divisions of the brain into two hemispheres, the cerebrum, the cerebellum, etc., were of course known, but the various convolutions of the brain surface were deemed to be simply fortuitous by the anatomist, the physiologist, the physician, or the surgeon, and that one convolution had no more value than another. Investigations in the last twenty years have definitely mapped out the brain, showing that the convolutions and fissures are not arranged hap-hazard, but on a definite plan. A portion of the brain at the back of the head and a little at the side of the head are fairly well known, well enough indeed for the successful performance of extraordinary operations in diseases and injuries of the brain. But all the rest of the brain is as yet almost a *terra incognita*—an Africa standing expectant for its Stanley. Here again is another problem seeking solution, a problem which is enough to arouse the scientific ambition of any enthusiastic mind.

Again, it is only within the last five years that an accurate knowledge of the relation of diseases of the ear to diseases of

the brain has been recognized, and their scientific surgical treatment begun. The splendid results already achieved give promise that within a few years we shall know not only how to cure brain disease the result of disease of the ear, but what is far better, how to prevent it.

The anatomy of the nerves has been known for many years in its gross outlines, but the problems which present themselves here are many and varied. Cut a certain nerve, the ulnar, which supplies the inner part of the hand, and the results are not the same in all patients. You may abolish touch and yet pain will remain. You may even, as I have seen within the last few weeks in several cases, cut out one to three inches of the sensitive nerve of the face, and it will be reproduced, and with this the frightful pain of *tic douloureux*, for which the nerve was removed, will return. On the other hand, by a wound or an operation from one to three inches of a nerve may be removed, and you want the nerve to be reproduced and so re-establish sensation in the skin supplied by it and motion in the muscles to which it goes, and the nerve steadily refuses to reproduce itself. Why in the one case it will and why in the other case it will not reproduce itself we do not know. In fact, what we do not know about nerves alone would make a good-sized book.

Thirty years ago when we looked at an eye all we knew was what we could see on the outside. The trouble was that nothing could be seen inside of the eye, although there was such an inviting window in front of it by which we could look in, because the interior was totally dark. But it occurred to Helmholtz that if by a little bit of looking-glass he reflected light into the eye and then scratched a little hole in the quicksilver, he could look through the hole into the illuminated interior of the eye and see all there was inside of it. From this simple idea has arisen the ophthalmoscope, by which the whole medicine and surgery of the eye have been revolutionized, and great light has been also thrown on the diseases of the brain.

Again, when the mouth was opened, we could see certain parts, but the whole interior of the larynx and windpipe was beyond our sight and therefore beyond our knowledge. But soon after the ophthalmoscope was discovered Czermak and Türk found that if a little mirror were held in the back of the throat at an angle of about forty-five degrees and a ray of light were thrown upon it from a small perforated bit of looking-glass, the interior of the throat like the interior of the eye would be illuminated, and we could look through the little hole in the looking-glass and see the reflected image of the vocal chords and the whole of the larynx in the mirror.

Similar inventions await the ingenious investigator of the future for the examination of other cavities and organs of the body, and the day is not far distant when we shall be able, I hope, to see and therefore to know the interior of the stomach as well as we do the exterior of the body. That this will illuminate our own minds as well as the stomachs of our patients is certain.

And so I might go on in one department of medicine after another, presenting to you similar problems, some of them so technical that they would not be suited to a non-professional audience, and in each show you the vast need there is for bright minds. Has the last word been said in surgery, in medicine, in the diseases of any of the special organs of the body? Nay, verily we are but at the alphabet of investigation and of cure. Great as has been the progress in the last fifty years, greater I venture to say than in all previous time, I believe that the next fifty years will far eclipse the discoveries of the past fifty. Who could have predicted the rise of Bacteriology a score of years ago? And who will venture to say that in the next twenty years another science equally far-reaching, equally beneficent, equally brilliant in its achievements, may not arise? Even the present is a splendid time,

“An age on ages telling
To be living is sublime.”

But the twentieth century in which you will live will be the most glorious time of all the ages. But you may take part in this grand march of progress, not only in the rank and file, but as a leader if you will but write. Or it may be, if you have the gift of imparting knowledge, you may be one of the teachers of medical science, an enviable post of honor and responsibility but also of unequalled enjoyment.

Have I not put before you enough to arouse the ambition, the energy, the benevolence, the enthusiasm, of any young man about to choose his career? Can there be in any other department of human knowledge so fine a field for research, for discovery, for fame, and what is far better, for serving the human race? If, in consequence of what I have said to you, some of you will select Medicine as your chosen pursuit, rest assured that if you will faithfully perform your duty, at the close of life you will have the pleasure of surveying a career which has been advantageous to yourselves, has been a means of doing good to your fellow men, and I verily believe has approximated as near as possible to the Divine Life as is given to any man to do.

