

SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

FRIDAY, JUNE 2, 1905.

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THE PHYSICIAN OF THE FUTURE.*

THE day which marks the beginning of a career is always one of interest. Especially is this so for him whose career begins, if indeed a career can be said to have definite commencement. But little less of interest, however, is felt also by his friends, and the day partakes of the nature of an inauguration or a marriage. It is a general day of rejoicing. The graduate himself is happy in the thought that his labors, at least for the time being, are over; his friends are glad to see the honor which he has earned, and the general public takes almost the same interest in the graduate that it does in the lover.

This particular occasion, when those who have completed the prescribed course of medical and dental science present themselves to receive their degrees, is of especial interest. This probably marks the last commencement of the medical and dental school of old Columbian. More than three quarters of a century of achievement marks her successful career. Thousands of graduates scattered throughout the land are proud of the alma mater who started them in life. The change of name, therefore, to George Washington University is not looked upon with unmixed joy, especially by the older children. A mother is, perhaps, no less a mother because, when widowed, she marries another man and takes another name. The academic mother

* Address delivered before the graduating class of the medical and dental schools of Columbian (George Washington) University, Monday, May 30, 1904.

of this widely scattered and numerous family need be no less loved, no less cherished and no less helpful than under her old name.

There are some of the arts which are nearer to the welfare of man than others, and the same is true of the sciences. There are two arts, however, which lie very near human welfare and if we were called upon to give up all of the arts but two, I think there would be little difference in choice as to which two should be preserved. The one most important would be the art of agriculture and the next the art of healing. Man first of all must be nourished and next to this, kept in health.

We might look forward to a time when lawyers would disappear. We might even grow so perfect as to be able to do without ministers of the gospel. Even the histrionic art might be abandoned, and yet mankind be reasonably happy. But strike down agriculture and you strike a blow which is fatal; banish the healing art and you leave man to the ravages of disease. It is, therefore, probably not without some fitness that you have asked a 'farmer' to deliver this address, and it is quite becoming that on this occasion Ceres and Hygeia should be seen hand in hand.

The man who receives his degree believes he knows something and the public supposes that his belief is well founded. The amount known, however, or supposed to be known, varies greatly for different degrees. The college graduate, it has been said, doubtless supposes that he knows all things from *A* to *Z*, but the faculty and trustees, with a better idea of his accomplishments, give him only the degree *A.B.* If I remember aright my Roman numerals an *M.D.* should know at least 1,500 times more than an *A.B.* Yet without doubt the degree *M.D.* or *D.D.S.* should carry a greater ballast of knowledge than the first degrees

of the academy. We may, with reason, doubt the propriety of conferring the degree of 'doctor' even upon those who have accomplished as much as you young men who are now before me. *Doctor* signifies 'knowing,' 'learned.' The physician should not—and perhaps no one should—bear this degree who has not added something to the sum of human knowledge. Some of the most famous surgeons and physicians of England are only plain 'mister' and I fail to see where there would be any diminution in your skill if the degree which you receive to-night were 'bachelor' instead of 'doctor.' I am not quarreling, however, with the usual custom, but mention this matter only to show you that bearing this degree you assume a responsibility of which you must strive to be worthy. The doctor is the teacher, the learned man, the *knower* as well as the *doer*. He is the man to whom people must come for knowledge, advice and inspiration. He is, moreover, the *dux*, the *imperator* in the empire of knowledge. Like the thirsting Omar Khayyam, each one should be able to say, 'Myself when young did eagerly frequent doctor and saint and heard great argument,' but the doctors and saints should be of better quality than in those medieval days, for in the present day we should not be compelled to add, 'About it and about but evermore, came out by the same door as in I went.'

Health comes largely from good food and good hygiene, but one of the necessities to health is good mastication. Teeth are useful for other purposes than merely to improve looks, but even if they were only for this purpose they would be worth saving. Many a man has married a beautiful set of teeth and, perhaps, afterwards discovered, to his amazement, that they were the fruit of dental science, but

you young men who have studied dentistry and have become proficient in the art should think the making of teeth to be the least of the purposes of your future life. As in surgery, dentistry is conservative, and you will serve man best if you will enable him to keep the teeth which nature has provided. The physician of the future as well as the dentist must be the arbiter of good health, and good health comes largely from good food and good hygiene; good food well masticated and good hygiene well applied.

The farmer furnishes the food, the dentist secures its mastication, and the physician formulates the laws of health and helps to restore to the normal any diseased organ of the body. The first thing, therefore, which the physician of the future must see to is the food supply, not that he is expected to till the soil and produce its fruits, but that he is to help in the great work of restoring foods to their normal state.

To what lengths have the arts of adulteration gone? There is no time to-night to preach to you about the awful evils of food adulteration, not only of its effect upon health, but of its demoralizing effect upon the honesty of commerce. It is a matter of which the medical profession of this country may be proud, namely, that as a unit they stand committed to the cause of pure food, to opposition to fake advertising, to the restoration of honesty in the trade in food products, and to the elimination from foods of drugs which are useful only in cases of disease. The great army of dentists also in this country stand in the same rank. They are aware, in fact, that if the functions of an organ are suspended the organ itself sooner or later suffers atrophy, loses its power of functional activity, becomes abortive in the course of ages and rudimentary. Thus the great

professions of medicine and dentistry in the future will stand together to fight the evils of predigested and prechewed foods. Predigested food will cause the stomach to shrivel and become finally only a rudimentary organ. Prechewed food will in the course of ages produce a toothless race. It is bad enough to lose one's hair, but for heaven's sake let us keep our teeth!

I do not care who makes the laws in this country if you will let me furnish the people with good teeth, nor who writes the songs if I can help to keep the stomachs in prime condition. It will be a sad day for humanity in the future when pepsin loses its savor and is furnished only by the chemist and not by the secretory glands of the stomach. See to it then that future generations have something to chew and something to digest, and to this great end much of the energy and ardor of the investigations of our future physicians and dentists must be directed.

The physician of early ages was a magician and necromancer. The medicine man of savage tribes is still practising the art of incantation. It is a far cry to Æsculapius, but before his day even disease was supposed to be the work of evil spirits. In fact the most destructive swine plague that we read about in the Bible was caused by the devils which were cast out of sick men, and these devils, taking possession of the swine, caused them to rush into the sea and be drowned.

The age of magicians in medicine was followed by that of the empiric, which was a great advance and led to the foundations of real science in medicine. The empiric we still have with us and always will have as long as man has idiosyncrasies. We can never tell in any individual case what the result of any certain treatment will be because we can never properly estimate the value of the individual idiosyncrasy.

Empiricism is one of the legitimate aids to science. A great inventor like Edison who wishes to find a certain property tries in logical sequence everything that is practicable, and often it is only after thousands of trials that the substance having the requisite quality is found. So empiricism in medicine is legitimately applicable when guided by scientific reasoning and sound principles.

The age of empiricism, however, was followed by the age of rationalism in medicine and it is on this basis that the science of medicine stands to-day. Perhaps I should not say science of medicine, but the art of medicine, because the art of medicine itself is based upon certain sciences, for instance, the science of anatomy, of physiology, of materia medica, of surgery. In fact there is not a science known to man which may not have some connection with the art of medicine.

If we look at the physicians of the present we find three classes have been founded as a result of rationalism in medicine: First, the general practitioner who of necessity must be brought in contact with all forms of human ills; second, the specialist who happily lives in a community where the physician who devotes his whole time to one particular study can be supported; third, the health officer who is the fore-runner of the physician of the future.

The foes of rational medicine at the present time are, first, the quack, a man possessing, possibly, high medical training and skill, but unfortunately devoid of those principles of ethics without which the honorable practise of a profession is impossible; second, the charlatan, a man necessarily devoid of any medical training or ability, who plays upon the feelings of his patients and administers nostrums of no value and applied with no science. The third foe of rational medicine is the imper-

sonal physician, namely, the nostrum, the patent medicine and the proprietary remedy. It is appalling to think of the thousands and thousands of our fellow citizens who pin their faith to these alleged remedies. Some of them have value; they are in fact often the very remedies which are described in the materia medica and the pharmacopœia and administered by physicians, but distributed as they are, with absurd claims of efficiency, taken as they are, without the advice or consent of a physician, they become not only one of the greatest foes of rational medicine, but one of the greatest dangers to the public at large.

I do not deny to the inventor who discovers a new remedy or a new combination of remedies the same right to profit therefrom which is accorded to the inventor of a new machine or a new process. The law protects the inventor of such a remedy and he can protect it by patent or by trademark, but it seems to me there is no excuse for the secret nostrums and no justification for the methods of advertising them. I know how difficult this problem is; I know what vast returns are received by the public press for advertising these bodies; I know how valuable the press is and I appreciate the great and good work which it does, but there is no justification for using the columns of the public press to deceive the public, to excite fears of dangers that do not exist and create hopes that can never be realized.

The physician of the future will see a growing preponderance of preventive medicine and the character of the profession in future years will be largely molded by the influence which this growth exerts.

The activity of preventive medicine will be shown first in the case of public and domestic hygiene. The laws of good living are fairly well known to but few people.

The public schools will surely become a medium of transmitting instruction in this line. Public sanitation in the course of its career may reach that abomination of contrivances in so far as offended hygienic conditions are concerned, namely, the sleeping car. It is difficult to imagine any contrivance which human ingenuity could construct better calculated to secure the best conditions for disease and the best methods for propagation thereof than the sleeping car. Constructed in such a way that ventilation is practically impossible; partitioned into small compartments, carefully curtained to prevent any circulation of air, if there should be fresh air; provided with enough heating surface to the cubic yard to complete the installation of a Turkish bath, and manned by porters to whom high temperature is an evidence of heavenly bliss, it is not difficult to conceive of the tortures to which the helpless passenger is exposed. These compartments often carry, without any precautionary inspection, persons in all stages of phthisis and even other contagious diseases. There is no health officer to inspect incoming passengers, no provision of the law requiring complete fumigation and no systematic appliance of any kind to prevent or eradicate disease. It has been claimed that the blankets are *washed at least twice a year*, as if that alone were a sufficient excuse for all of the dangers that exist! Perhaps, if one used the same blanket himself all the time he might not be justified in objecting to such frequent ablutions, but what right have we to ask if such a *careful* purification of a blanket used by a different person every night is based on any of the broad principles of hygiene or good taste?

The composition of the air in a sleeper filled with passengers, after a night of low temperature can better be imagined than described. It is true that no one is com-

pelled to spend the night in these compartments, but the ordinary coaches are not much less objectionable, and thus the traveler is left only with the option of staying at home or walking to his destination.

The physician of the future will gradually teach the people the principles and necessity of public and private sanitation, for domestic hygiene is no less important than public. That dread scourge of humanity, consumption, will find its most effective foe in the establishment of true principles of hygiene both at home and in public places.

The medical profession of the future will also see extended and placed upon sounder scientific foundations the antitoxin theory of prevention and cure. The world owes a debt of gratitude to Pasteur and his co-laborers in this and other countries for establishing the foundation, on broad scientific grounds, of the idea that immunity may be artificially, as well as naturally, produced. Jenner was the forerunner of this great school of medicine, but his practice was absolutely empirical. Neither he nor his followers had any idea whatever of the manner in which vaccination renders the subject practically immune to smallpox. Advanced medical science has revealed the fact, however, that not only smallpox, but many other deadly diseases owe their toxic development to the compounds produced in the system chemically allied with the nitrogenous constituents of the body. The moment these poisons become dominant in the system nature makes an effort to eliminate them or to neutralize them. In other words, the toxic body is met and combated by the antitoxic body. One of the greatest triumphs of the science of chemistry has been the determination of the character both of toxic and of antitoxic substances and the development

of the method of producing them both, especially the antidote. You have been fully instructed in the principles of this modern branch of medicine and know how closely your future professional activity will be connected therewith.

Perhaps it is not wise to prophesy a time when enzymic diseases shall lose all their terror by reason of the discovery of effective antidotes to the poisons to which their ravages are generally due. It is reasonable, however, to look forward to the time when the terror of these diseases, namely, diphtheria, typhoid fever, typhus and kindred scourges shall be reduced to a minimum.

If, as has been well demonstrated, the germ of typhoid fever is transmitted principally in water, there seems no reason to doubt the ability of health officers, collaborating with broad-minded municipal authority and high class engineering skill, to perfect means whereby this deadly germ shall be practically eliminated from our water supply. Consumption may be checked by the establishment of camps of detention where the unfortunate victims of this terrible disease may receive not only the highest degree of proficiency in medical treatment, but also be so segregated from the non-infected portions of the community as to render the spread of the disease difficult.

Moses himself was a sanitarian of no mean accomplishments and many of the principles established by him in sanitary science might well be exploited in modern times. The type of camp which he established for the detention of unfortunate lepers, well modified to suit modern principles, would serve for the check and practical elimination of consumption.

I realize vividly the effect of a mental nature produced upon people of highly sensitive constitutions and of an impres-

sionable nature, such as the victims of phthisis usually are, in being made practically prisoners in an environment of misery and despair. This, however, is not a question of sentiment, it is a principle of existence. It is based upon the undoubted right of the healthy to be protected against the invasion of disease. Moreover, a detention camp might be made attractive in every way with beautiful gardens, sunshine, flowers, music and all the other agreeable arts of life, and thus the terrors of detention be robbed of their chief significance.

The physician of the future will, therefore, be the herald and exponent of prophylaxis. It seems a contradiction of terms to predict a future for a learned profession, which, if perfected, would rob the profession of all of its emoluments; but with the changed condition of the future physician a change in the character of his emoluments will also come. The medical profession, in other words, will not be paid in proportion to the amount of sickness which prevails, but rather in proportion to the degree of health which is maintained. That physician will have the largest compensation whose parish is freest from disease. He will become the teacher of the principles of public hygiene, as before mentioned, in the schools, colleges and hospitals; he will, in my opinion, become largely a public officer, and every state, city and town will have as one of its chief officials a medical health officer. Surely such an officer is quite as important to the welfare of the community as the assessor and tax collector. The physician of the future, therefore, will become more and more active as a citizen and take a more lively interest in public affairs.

I have looked carefully over the congressional directory of the Fifty-Seventh Congress and find that the congress of the

United States contains 319 lawyers, 93 business men, 32 politicians, 12 editors, reporters and newspaper writers, 8 farmers, 3 teachers, 1 clergyman, 1 military man and 3 physicians. Does it not seem strange that the great law-making body of our country should contain so few members of this learned profession? Think for a moment of the amount of legislation in which sanitary matters are involved! It is acknowledged by all that the building of the Panama Canal is more a sanitary problem than it is an engineering one. The men who really build the Panama Canal will be the physicians and health officers who eliminate from that infected locality the germs of malaria and infectious diseases. If the canal fails it will not be for lack of dredges nor shovels nor picks nor machinery nor money; it will be due to the ravages of cholera, of yellow fever and of other malarial diseases.

The importance of the quarantine service has not been fully recognized. The exclusion of disease is the easiest way to fight it. The splendid work of the Public Health and Marine Hospital Service is one of the things which the national legislator should carefully support.

The legislation relating to pure food is a matter of the utmost sanitary importance. The regulations of interstate commerce which omit the sanitary conditions which have been previously outlined are altogether incomplete. In fact it appears that a very large proportion of our legislation which really concerns the public welfare should be accomplished with the advice, the vote and consent of the medical profession, and yet out of more than 400 members of the national congress only three have had any medical training. The congress of the future will contain not less than 1 per cent. of trained medical men, but let us hope as much as 25 or 30 per

cent. Again, there is no reason why a medical training should unfit a man for other duties in connection with public life than those relating to sanitary measures. I can see no reason why a physician should not make a good president as well as a good major general, a good governor or a good mayor, a good member of the common council and especially a most excellent commissioner of sewers. We wish the future to see the entry of medical men into public life and the assumption by them of all duties of a nature which relate to the public welfare. I can see no reason why lawyers should predominate in our national congress any more than that physicians should hold the balance of power. Perhaps I can not better illustrate this idea than by quoting from that master of political craft, that learned and erudite statesman, ex-Senator David Turpie, who says in his book, entitled 'Recollections of My Own Times,' in speaking of Senator Dr. Graham N. Fitch:

Fitch was the only physician who ever served from Indiana in the United States Senate. I have latterly reflected somewhat upon this solitary instance. Years ago we used to send a good many of our physicians to Congress. He, himself, was one of these, and there were several others, among whom I recall Dr. John W. Davis, of Carlisle, in the county of Sullivan, whom I knew quite well. He was the first Indianian chosen to the position of speaker of the House at Washington and was accounted the best parliamentary jurist in the country, perhaps in the world. His rulings were quoted as authority in the English House of Commons and more than once in the legislative chambers of France. Upon his voluntary retirement from Congress he was appointed minister of the United States to China; served with distinction among the polished diplomats of the Orient, and returned to accept the appointment of governor of Oregon. He was the first American civilian of official note and station to make the trip homeward from the east by way of the Pacific. His voyage across the ocean lasted several weeks. I have heard that the account of it, then no twice-told tale, was a story of thrilling, almost tragic interest.

In these later times our practitioners of the healing art seem studiously to avoid the cares and labors of political life. Occasionally you may meet a physician in the legislature—even this, as some of their caste say, is unprofessional—but as a body they appear to prefer the position of out-fielders in this arena. There are two notable characteristics of the active and skilled physician—a close observation of detail and a deft attention to the matter in hand—the duty of the hour, of the moment. These qualifications are admirably suited to the requirements of public life. No more favorable hope can be expressed for the future than that the members of this great profession will again resume an active interest and prominent position in the political affairs of the state and nation.

The physician of the future will have no easy berth, for, in his profession, as in all others, fitness, tact, erudition and industry must win the way. The sluggard, the ignoramus and the indifferent must fall by the wayside.

The number of people entering the medical profession is probably too great. In the United States of America, including the Philippines, Porto Rico and Hawaii, there were in 1901, 115,222 physicians in a population of 84,332,610. The last complete data we have concerning the number of attendants in medical schools are for 1899. In this year there were, excluding graduate schools, 156 medical schools in the United States with 24,119 students. The growth in the number of medical students in twenty-one years has been 142 per cent.

In addition to these undergraduate schools there are eight graduate medical schools which had (in 1895) 624 instructors and 1,813 students, of whom 59 were women.

In Germany the conditions are quite unsatisfactory and the overcrowding of the medical profession in that country is a matter of grave concern. There are now in the empire 29,200 physicians, which doubles the number found in 1876. In other words there is one physician in Ger-

many for every 1,700 inhabitants. In the city of Berlin 46 per cent. of all the physicians have an income of less than \$700, and five per cent. of the whole number do not have a sufficient income to return it for taxation.

On the other hand, in the legal profession in Germany 80 per cent. of the lawyers have an income exceeding \$2,000.

It is estimated that the preparation of a man for the duties of a physician in Germany costs about \$6,000, and thus it is seen that the income is often less than 10 per cent. of the fixed charge on the capital invested. This leaves practically nothing for the reward of his own personal services, nor for wear and tear.

What are to be the remedies for this condition of affairs in the future? Shall the physicians organize a union and admit only a certain number of apprentices each year, or shall they have the requirements for admission, when properly applied, exclude all those who are not extremely well prepared? In the great school of the Beaux Arts in Paris the number of admissions is strictly limited and, perhaps, the great world school of medicine will have to come to this condition of affairs. In fact, an approach has been made already in at least one great medical school of this country, and candidates for the degree of doctor of medicine are not admitted until they hold a previous degree of an academic character or study equal thereto equivalent to the course of study required for the ordinary degree of bachelor of arts. The effect, however, which was anticipated in this particular instance was not realized. Indeed, there was at first a diminution in the number of students in attendance, but, attracted by the greater fame which a degree from such an institution would afford, this condition was gradually overcome and the actual

number of attendants became greater than when admission was easier.

This is indeed a serious question. I doubt if the charge for medical services in the country can be much larger than \$1.00 per head, and it is thus seen that the 115,000 physicians of this country must be content to divide among them a paltry income of less than \$90,000,000 at the present time.

Finally, the physician of the future will find his greatest service in prolonging human life. I am not here to claim that human life is so valuable that it needs always to be prolonged. This may not be so from the general economic condition of affairs, but, personally, I think we are all more or less interested in longevity. It can not be denied that there is a distinct economical gain in putting a man out of the world after he has passed his prime and before he becomes a burden upon his friends or the community. The asylum and the poorhouse are not to be regarded as shining lights of advanced political economy, but there is something in life besides mere political economy, and the prolongation of existence is regarded as one of the chief functions both of the medical profession and of public charities.

On the other hand, it must be considered that there is a distinct economical loss in cutting off from existence a man before he has run the full course of his career. To train a man for usefulness requires now fully a quarter of a century, and it seems only fair that he should have at least twice that time for the manifestation of his activities. If, therefore, he be cut off at thirty-five, forty or forty-five, the community is robbed of service to which it is entitled.

If old age could be secured without much of the burden now attending it, there would be the gradual ripening and mellowing of

all the functions of the body and mind. If, in short, the human organism could be so constructed and cared for that it would continue its functional activity like the wonderful 'one hoss shay' until the time of its final dissolution, such a consummation is devoutly to be wished.

The medical profession of the future will find its best exponent in the service of senectitude. An old age without illness or dementation, a ripening without decay, a completion of the functional activity without the breaking down of any organ are steps toward which the medical profession of the future may well direct its energies.

Death should not be regarded as a misfortune, but as an end, as a termination of a journey which has been filled with delight, as a rest for weariness which comes with the natural order of labor, as an euthanasia and not a dreadful disaster.

H. W. WILEY.

U. S. DEPARTMENT OF AGRICULTURE.

*PROCEEDINGS OF THE CENTRAL BRANCH
OF THE AMERICAN SOCIETY
OF ZOOLOGISTS.*

THE third annual meeting of the Central Branch of the American Society of Zoologists, and the sixth annual meeting of the society since its original establishment was held at the University of Chicago, March 31 and April 1, 1905.

The following having received the votes of the executive committees of both branches were elected to membership in the central branch: James Francis Abbott, Bennet M. Allen, Lawrence Edmunds Griffin, Lynds Jones, C. E. McClung, George Wagner, L. M. Walton, Samuel L. Williston, Charles Zeleny.

The bill on vivisection before the Illinois State Legislature was discussed and it was

VOTED, That this society concur in the following resolution and instruct the secre-