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## Address

### THE RESEARCH IDEA AND METHODS IN MEDICAL EDUCATION AND PRACTICE.\*

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At the present day, there exists in our country an interesting and peculiar condition of affairs in the matters of medical education and of licensure to practice,—a condition totally different from that which existed here twenty or even ten years ago, or from that which is to be found in any other country in the world. The medical observer from a foreign land—for example Germany—finds here a situation in striking contrast to that which obtains in his own country.

In Germany, twenty medical schools suffice for the needs of 60,000,000 of people,—each is the medical department of a university of which it is an intimate and integral part, and these twenty universities are all under the one central control of the secretary of education for the empire. The admission requirement, uniform for all, is the completion of the course in a gymnasium,—about equal to the completion of the sophomore year in our better literary colleges. The course of medical instruction extends over five years, and is in the hands of men who are, uniformly, the recognized masters in their respective branches, the fundamental subjects, anatomy, physiology, etc., being taught by individuals, each of whom employs his whole time and energies in investigation and instruction in his chosen branch. The relation of the medical schools to the hospitals is such that abundant clinical material can be controlled and properly utilized. The medical graduate secures his license to practice by an examination, the *Staats-Examen*, which is uniform for the entire nation, and which is conducted by its ablest teachers who give hours and days each year to this laborious but important duty, subjecting the applicant to thorough practical tests which are in harmony with the methods by which he has been taught and which really measure his ability to practice his profession successfully. The license thus procured is good throughout the empire and its colonies.

How different from this admirable system is the situation which our inquiring visitor finds in the United States! We have 157 or more medical colleges, though our population numbers only about one-third more than that of Germany, and this number has been increasing at the rate of three or four a year for the last decade. These institutions are graduating about 5,740 physicians a year, at least 2,500 in excess of any possible demand. With few exceptions, they are under no gov-

ernmental control whatever; any person with the price of a charter may open a new medical school at any time and in some states may sell diplomas if he chooses so to do. Worse still, however, is the great inequality of standards which obtains in these institutions. As to admission requirements, there are schools which nominally demand little more than a grammar school education and this loosely enforced, while at the other extreme are two institutions which exact a bachelor's degree, a preparation about two years in advance of the German standard. Between these two extremes almost every possible gradation is represented. By the compulsion of the medical examining boards the required time of attendance on the medical school is now almost universally four annual sessions, but these range in length from six to nine months, a variation of thirty-three and one-third per cent. In many of these schools, the faculty is composed of the enterprising individuals who organized them or who have been given positions for considerations having little reference to their qualifications for the work to be done. In only a few schools, have the fundamental branches been placed in the hands of persons who are professional chemists, anatomists, physiologists, etc., these being, in most schools, taught by practicing physicians who not only have enjoyed no adequate preparation and possess no special fitness for the teaching of these subjects, but who have no intention of giving their energies exclusively to them. The wide diversity and illogical character of the curricula of these schools, recently pointed out by Drs. Harrison, Webster and others, make very difficult or impossible migration from one school to another, a custom which is one of the strongest features of the German universities.

The matter of licensure is in the hands of forty-five or more separate boards of medical examiners in the several states, with widely varying standards, most of them now requiring a separate examination, but, unfortunately, these examinations, for the most part are conducted by persons little qualified for that function, the statutes in some of the states expressly excluding from membership in the board, the individuals who are best qualified, namely, those who are engaged in teaching. With negligible exception, these examinations are wholly of written papers, not including tests which are in line with the modern practical methods of education. The general lack of reciprocity between the several states makes the license procured in one of no validity in any other, and this imposes great hardship on deserving and able practitioners whom circumstances may oblige to remove from one state to another.

Discovering such a heterogeneous medley of conditions in the medical system of a great and enlightened nation, would not our medical visitor inevitably exclaim that they are chaotic, and impossible? And could we logically gainsay the justice of his criticism?

\* Address to the graduating class at the Commencement Exercises of the Medical Department of the St. Louis University, 1905.

This condition of affairs has brought into disrepute the diploma of the American medical college throughout the world, because it has been known that the degree from some of our medical colleges signifies almost nothing in regard to the qualifications of the holder; yea, more, that there have been colleges in this country, with as high sounding titles as any, issuing parchments of gorgeous appearance with gold seals of imposing size, in which a medical diploma could be bought outright, the purchaser never having spent an hour within the walls of the institution. It has lowered the tone and status of the medical profession and has deprived it of the political and social influence which it should possess, by reason of the dignity and importance of its mission in the world, and which, in other countries, it does possess. The standing of any calling in the community is estimated not by the character and attainments of its ablest but by the quality of its average members. The ranks of the profession have become greatly overcrowded, the ratio of physicians to population being nearly twice as great in America as in any other country in the world. Recently there were examined by one board in a quarterly examination, 420 candidates. Perhaps the most serious evil growing out of our present situation is the harm which is being done to the present generation of medical students, hundreds of whom are each year being launched into a difficult and exacting career with a preparation utterly inadequate. These are the individuals who most of all are going to suffer hardships, disappointment and failure. Of the difficulties and embarrassments growing out of our nondescript system of non-reciprocal licensure, it is perhaps unnecessary to speak at further length. In some respects it is the most difficult problem which presents itself. Not only does the absence of reciprocity impose a serious and unwarrantable hardship on the older physician, but there seems great danger that in the effort to bring about reciprocity, the several boards of examiners, composed of well-intentioned but not always wise or properly informed members, may, with the large power which they possess, place great obstacles in the way of the real and continuous progress of the medical schools.

This unflattering sketch of the medical conditions in America is not overdrawn, but, fortunately, there are some encouraging features in the present situation which give promise of a sure, and, let us hope, a speedy improvement. The wide discrepancy in the character of our medical schools is due to the great advance of some and not to the deterioration of any. None is worse, perhaps not so poor, as some which existed twenty years ago; while some of them may be fairly counted in the first rank of the schools of the world. Several agencies are actively engaged in earnest efforts to improve the situation. Among these are the several examining boards, combined in two organizations, the National Federation of Examining Boards, and the American Confederation of Examining and Licensing Bodies; the Association of American Medical Colleges, which has been trailing along in the rear of the progressive movement for several years, gives some faint promise of at least maintaining a firmer attitude for higher standards. Recently, the American Medical Association, now a splendid and powerful organization, originally founded chiefly for the purpose of advancing the standards of medical education in America, but having withdrawn from active participation in this movement several years ago, has renewed its active interest

and has created a Council of Medical Education which promises to be a very useful and efficient factor, especially by co-ordinating the various other agencies which are seeking the same end. Fundamentally, however, the demand for this advance, the real impetus, must come from the medical profession itself, and in this regard, our hope rests mainly on the present and coming generations of medical graduates. The progress in the medical sciences and in methods of medical education has been so rapid in recent years that it has been quite impossible for the average practitioner to keep in touch with it. Few of the older physicians realize how inadequate would be the methods by which they were educated and the standards which obtained in their student days, to meet the great and increasing demands of the present time. It is to such men as you, gentlemen of the graduating class, who have been made familiar with the present state of the medical sciences, that the profession must look for an appreciative and intelligent effort to improve the present conditions. In many ways, these matters are of immediate and vital concern to you as individuals and as members of our great profession.

I have chosen to present in this address a measure which would do much to solve the difficulties above described, and that measure is the general acceptance and introduction into the American medical colleges of the ideas and methods of research. It is not offered as a panacea for all the ills of our body-medical, but I believe it would do more than any other one thing to improve the standards of medical education and practice, to elevate the tone of the profession and to unite and strengthen it as a body of scientific men.

Research is defined as "diligent, protracted investigation especially for the purpose of adding to human knowledge; studious, laborious inquiry. Specifically in science, a systematic investigation of some phenomenon or series of phenomena by the experimental method to discover facts or to co-ordinate them as laws." President Gilman has objected to the word "research," originally proposed by an English scholar, Dr. Appleton, as not a "felicitous term," and, etymologically, it is open to criticism. It has come into such general use, however, that it is pretty certain to continue as the accepted designation, though doubtless other phrases which have been suggested, such as, "the advancement of knowledge," "creative action," "constructive scholarship," "original investigation," etc., are more comprehensive and definite.

Research as an individual pursuit and accomplishment is as old as human progress. From the time of Hippocrates, medicine has been blessed with a continuous line of investigators and to the patient, persistent and deliberate search of these earnest, inquiring minds we owe the vast stores of medical knowledge which we possess to-day, for the facts which have been discovered by chance are so few as to be of no practical account. All the great names which we honor in the history of medicine are the names of investigators. Hippocrates, Galen, Vesalius, Harvey, Ambroise Paré, Boerhaave, Laennec, Louis, Trousseau, Virchow, Ludwig, Liebig, Hoppe-Seyler, Sydenham, Hunter, Gross, Flint, and the host of others whose names are immortal, were all seekers after and contributors of new knowledge. In all ages there have been men—teachers of medicine, who were profoundly versed in the knowledge of their time, yet who made no additions to the store of facts. Of wide reputation as were many of these men in their

time, their names are with rare exceptions forgotten, as are those of the great performers in music of past generations, while the name of the composer of even a single great musical creation, obscure though he may have been in his own day, lives forever.

While research as an individual accomplishment is ancient indeed, its recognition as the chief and most necessary function of the institutions of higher learning, is comparatively modern. Though the majority of investigators in past centuries have been members of some university and have accomplished their discoveries within its walls, these researches were regarded as quite apart from their function as teachers. The obligation of the university to support investigation as one of its most important and vital functions may be said to have had no large recognition until the reorganization of the German university system after the Franco-Prussian war. In the rehabilitation of these institutions at that time, great prominence was given to this feature and abundant support was provided for it. The idea was transplanted to American soil by President Gilman in the plans for the Johns Hopkins University, inaugurated twenty-eight years ago, and from this center has spread rapidly and widely to other American universities. And what a revolution it has wrought in our educational ideas and methods! No institution to-day pretends to rank as a real university in which original investigation is not being carried on and supported in some or many branches of human knowledge. The relative greatness of such an institution, as determined by scholars and those who are best qualified to judge, is proportionate to the amount and character of its productive work along investigative lines, rather than by the number of its students, the number and magnificence of its buildings or the magnitude of its endowment. What has made Germany the Mecca of all inquiring medical, as well as other scientific men for the last thirty years? Nothing but the fact that in the German universities were to be found the leaders—the masters in the medical and scientific thought of our time; and they were masters because they were investigators provided with every opportunity for research and with freedom to pursue the truth without let or hindrance whithersoever it might lead. What has made the Johns Hopkins Medical School the recognized center of progressive and stimulating medical thought in this country, excepting that conditions have there prevailed similar to those in the German institutions?

"But," it is often contended, "while such institutions have their place for the training of medical investigators, and of the select few in the profession, it is the business of the ordinary medical school to train men for the practice of medicine; and as such it has no concern with research." These sentiments are expressed in an address recently delivered before the alumni of one of the eastern medical colleges. Referring to the high requirements for admission now demanded in some medical schools, the speaker said: "As a basis for the conduct of research work, literary preliminary training and a knowledge of modern languages may be regarded as imperative, but for the fulfilling of the ordinary duties of professional life to the public, these higher requirements are still held in abeyance." And again he said: "A distinction ought to be made, however, between those institutions which are using the laboratory method as a means of elementary instruction in connection with medical col-

leges, and the universities that offer unusual laboratory facilities in which specialists may do research work. The medical college laboratory needs only to be practical from the student's standpoint. The laboratory for research must be unusually and specially equipped. The end to be attained in each case is so entirely different that it is unfair to compare the laboratory of the one with that of the other."

It is this narrow conception of the so-called "practical" in medical education and practice, the idea that the student who is to become a physician, in the ordinary sense of the word, needs any less thorough or scientific preparation than the research worker, which I wish earnestly to combat. The true physician is a research-worker every day of his life, in the study of every case that comes to his care, and the best possible preparation for his work is exactly the same preparation which is needful for the investigator, in the largest scientific meaning of that word. This fact has already been abundantly demonstrated by many schools and by the many graduates of these schools. The research idea, as applied to medical teaching, is not a mere theory, an academic proposition, but a demonstrated, feasible and advantageous method. The real question is simply this, is it applicable to all medical colleges?

It will naturally be asked: "Just what is implied by the research idea and method as applied to medical education?"

First, we may say, the full recognition of the fact that research is a legitimate and necessary function of every medical school. The faculty of such an institution is in duty bound to make contributions to the world's store of facts, methods and principles. To this end, it must number among its members, especially in connection with the fundamental branches, men who are devoting their time and energies exclusively to research and teaching. Only in this way can there be secured men who are competent to instruct students. Whatever may have been the case in the preceding generations, in our day the real masters of any branch of knowledge are uniformly those who are contributors to that science, and not merely transmitters of the knowledge of previous workers.

We need such men, moreover, in the clinical branches, men who, relieved of the burdens of ordinary practice, and supported by adequate salaries, are able to devote their entire time to the study of hospital cases, and to the exhaustive investigation of disease in the hospital ward and laboratory.

Second, these men must not only be given a livelihood, but they must be provided with suitable material and appliances, and with adequately trained assistants. All this means expense, and large expense, too; a cost altogether too great to be borne by the student, the expense of whose instruction has already reached the limit of his means. Moreover, as the fruits of this research are to be enjoyed by the community it is proper that the cost should be borne by the community through private endowment or by the aid of the state.

The connection of the medical school with a university is exceedingly desirable, indeed, almost an imperative need. So far as research itself is concerned, some of the very best work has been in small institutions, and, for that matter, entirely outside of any institution whatever. The intimate correlation of the several sciences, of late becoming more evident, and particularly emphasized by the scientific congress which met

in St. Louis last summer, however, makes it of advantage that workers in anatomy, physiology, embryology, bacteriology, pathology, etc., and not less in the clinical branches of medicine, should be in close relation with those who are expert in other sciences, especially physics, chemistry and the other biologic departments.

The medical school almost of necessity must be a university department if it is to receive large endowment either by the state or at the hands of private individuals. It is true that in Pennsylvania the legislature has lavished money with prodigal hand on the private medical institutions of that commonwealth, but the system is a bad one, and is not likely to be followed elsewhere. Private donors are little likely to give large sums to an institution members of whose faculty constitute a majority of its trustees and who may vote themselves all of its income in salaries if they choose so to do, but with what confidence may not the university ask for large sums for its medical department? Its substantial and disinterested board of trustees, composed of the members of a great church or of business men of proved integrity and judgment, is as certain a guarantee as can be offered, that all its funds will be wisely used. What department of the university can present for consideration with more firm assurance than that of medicine its great needs and tremendous possibilities, or make a stronger, more telling appeal to the average man of affairs? One would not for a moment disparage those lines of investigation which seem remote from immediate human needs; all truth-seeking is worthy of support. A wise university president has recently said, "No knowledge of substance or force, or life is so remote or minute, although apparently indefinitely distant from present practice, but that to-morrow it may become an indispensable need. It cannot be predicted at what distant nook of knowledge, apparently remote from any practical service, a brilliantly useful stream may spring. It is certain that every fundamental discovery, made by the delving student, has been of service to man before a decade has passed." The imaginary antithesis between the theoretical and the practical is vanishing, as Mr. Putnam, the Librarian of Congress, has admirably shown in a recent address. While, therefore, the claims of any department of human knowledge for the support of its investigators should receive the support of every intelligent man, we may properly enough recognize the fact that to the average man of affairs, there will appeal with especial force those lines of research whose practical bearings are readily demonstrated, and what a world of possibilities are already opened up along medical lines! Calling to mind the thousands and thousands of lives which have been saved by the discovery of the antitoxin of diphtheria—a fruit of the purest sort of laboratory research—think of the magnificent boon which would be conferred on humanity by a similar discovery for scarlatina, measles, pneumonia, epidemic meningitis, and other infectious diseases! What a weight of suffering and wretchedness would be lifted from the race could we solve the problem of cancer! It is the research feature of medical work which appeals with especial force to private beneficence. We have in this country some munificent foundations for this purpose—the Rockefeller Institute for Medical Research, in New York City; the Memorial Institute for Infectious Diseases, founded by Mr. and Mrs. McCormick in Chicago, and several smaller endowments for similar purposes. The medical school

which makes research a conspicuous feature, therefore, will be far more likely to secure pecuniary endowment than the institution which restricts itself to the work of instruction.

Yet another essential prerequisite for such a medical school as we are conceiving is a better preliminary training of its students than is now required by most medical colleges. This is imperatively demanded by the conditions of the time, for the good of the profession and the public, and for the protection of the coming generation of medical students. The sciences which lie at the foundation of clinical medicine have expanded enormously in the last twenty-five years, and during that period medical study and practice have made more progress in the direction of scientific exactitude than in all the previous centuries. There is still much that is empirical in therapeutics and even in diagnosis, but the modern progressive practitioner may now approach most of his problems by truly scientific methods, and the hope of medicine for the future lies in the direction of eliminating empiricism and substituting therefor exact methods—the thorough, accurate observation of clinical phenomena, strictly logical deduction from these observations, and the application to each case of well established principles.

To enter on the study of the medical sciences, thus conceived, comprehendingly and effectively, the student must possess a well trained mind, thoroughly grounded in the usual branches of English, Latin, history, mathematics, with a broad and thorough knowledge of physics, chemistry and general biology, and with a good training in the laboratory methods of these sciences, which do not rightfully belong in the medical curriculum at all, except in their application to medical problems. He should have, in addition to these, a reading knowledge of one modern language besides his own, especially of German. Even the best of the high school courses does not afford this preparation. The time has arrived when we may justly and of necessity demand of every person expecting to study medicine, at least two years of work, in properly selected branches, in a literary or scientific college. Bearing in mind the overcrowded condition of the medical profession in America, the large excess of graduates which are annually being poured into it; the readiness with which any earnest, energetic young man in good health, even though he be dependent on his own resources, may secure such an education as we have described; and with the certainty that his future success or failure depends more than all else on the breadth and thoroughness of his fundamental education, is it not reasonable to advance the entrance requirements of every medical school to the standard proposed? We are accustomed to speak of the admission requirements as being determined by the medical schools or by the medical examining boards; as a matter of fact, the essential requirements are really determined by the state of medical science and the conditions of the time; the colleges and examining boards simply interpret these conditions in fixing their own requirements. As this interpretation by a particular college is wisely or unwisely made, so, as a rule, will its students prosper or fail in the career for which the college is preparing them. Under the conditions now prevailing, and which are growing more exacting every year, the preparation afforded by a four-year high school course, plus two years in college, is not in any degree excessive.

To what extent should the individual student engage

in research work during his medical course? Is it proposed that he shall spend all his time and secure all of his education by such a method? Obviously, the second question is to be answered in the negative. While the fact needs to be emphasized that the chief purpose of a medical course is education in the true sense—a training of the powers of observation and of the mental faculties along medical lines—the acquisition of many facts is essential, and for these he must draw on the great storehouse of knowledge already accumulated. The tremendous advantage of obtaining as much of this knowledge at first hand, by contact with and a study of the objects themselves, as contrasted with the mere memorizing of facts as written or spoken by others—is already universally recognized in the numerous laboratory and practical courses which have so largely supplanted the purely didactic methods of former years. For the most part, however, the student must be dealing with facts and principles already established, though he may approach these to a considerable degree by the methods of original investigation. To every student there should be assigned each year a subject for investigation in which he may actually explore the realms of the unknown by the exact, painstaking methods of research. It will give a zest and enthusiasm to his medical studies which no other plan affords. The wise selection of these topics for research and their judicious assignment among the students according to their special abilities and predilections, is a task requiring careful deliberation and discriminating judgment. The topic should be well within the capacity and equipment of the one to whom it is assigned, should be one that is really worth investigating, in order that he may feel that his results will be of value, and it should have as wide bearings as possible and thus necessitate his seeking information in many collateral topics and branches. Such an investigation need not by any means be a narrow or narrowing mental exercise. With a suitable subject, properly pursued, a seemingly small problem may bring the worker into contact with a very wide range of medical facts and principles in almost every branch of medicine. President G. Stanley Hall, in his recent book on "Adolescence," gives an interesting account of an experience of his early student days in the laboratory of a German professor, who set him to work on a frog's muscle. At first it seemed a trivial topic indeed, and far removed from the large field of study which he had planned, but presently he discovered that to comprehend the method of action of the frog's muscle, he must know thoroughly its minute anatomy and that of the surrounding structures; a knowledge of the nervous system was essential; the action of the muscle was dependent on its nutrition, and this involved an investigation of the physical and chemical processes going on within the muscle as well as in the digestive tract; a comprehensive study of the topic must include the embryologic development of the muscle, and a comparative investigation of the muscles of other animals. Few subjects of investigation if exhaustively pursued, will fail to lead one into numerous by-paths, involving the study of many and diversified facts, at first thought remote from the original starting point; and psychologically, facts thus garnered, cling to the memory, and become part of one's available classified knowledge as do those gathered in no other way.

Such a course of research work need occupy but a minor portion of the student's time, but it will imbue

him with an interest and an earnestness in all his other work in a manner truly marvelous. This is no fanciful speculation, it has been observed by many teachers over and over again.

Then, too, the spirit with which one approaches his research work in the laboratory, and the methods by which he proceeds, are exactly those which the successful physician must make use of in the study and treatment of his patients at the bedside. Every case is a problem by itself, no matter how one may classify and designate the particular group of symptoms which it presents. No case of disease, exhaustively considered, is ever exactly like any other, and to the degree with which the practitioner recognizes these differences and adjusts his treatment thereto, to that degree will he be a wise and successful physician.

The union of research and instruction in the medical school is thus of advantage, on the instructional side in that it secures the highest grade of instructors, it affords almost the only basis for procuring pecuniary endowment, it necessitates a better preliminary training of the student, and it provides a method of instruction which gives a new inspiration and enthusiasm to the student, and affords the most logical and effective preparation for his life-work. Such a union is likewise in the interest of research. In the work of instruction the majority of investigators find a stimulus and an inspiration which is highly valued. Says President Gilman: "We often hear discussions as to the relation of instruction to research, sterile intellects attribute their non-productiveness to overwork, when a more acute diagnosis detects a lack of will-power; Sylvester, the great mathematician, said that his mind was never so fertile as when excited by the queries and criticisms of his pupils; and scores of our contemporaries would say so, too. On the other hand, certain minds have done their best work without any pedagogical obligations—no more absolute rule can be laid down than this—let those who have the duties of a professorship discharge them well; and those who have leisure be sure it is not wasted."

Another and more cogent reason why research must, in large measure, be combined with instruction is the fact that such a plan alone affords the investigator the opportunity to select and to train his successors. If medical research is to flourish in this country its most imperative need is that of a continuous and sufficient supply of competent investigators. The successful investigator is both born and made—and their number is very few. Not infrequently he is discovered in a laboratory, in the person of one who would least be suspected of possessing the essential qualifications. The successful conduct of some routine piece of work which has been assigned to him discloses the fact that he is endowed with the essential requirements, and careful training develops him into a ripe and successful worker; but he is one among hundreds, and the master, in order to develop a few competent successors, must have opportunity to study and to select from a large number. Institutions for pure research are useful and necessary, but it would be unfortunate—aye disastrous—both to research and to instruction if they were to be generally divorced. They must, for the most part, in the future as in the past, go hand in hand, if the best results are to be secured.

Finally, the sort of training which has been outlined, would improve the character of medical practice in this country to an immeasurable degree. The pursuit of



knowledge by the methods of the research worker develops, as do no other methods, a love of truth for its own sake, an intolerance of guess-work and of pretense, and a patient, painstaking thoroughness and accuracy in observation and deduction, which are greatly needed in this country. We have alluded to the distinction which is constantly made between the theoretical and the practical. How long must it take us to learn that the only practical knowledge is thorough, exact knowledge? A practical education is not comprised in the mere accumulation of those facts of anatomy, chemistry and the other fundamental medical sciences, which seem at the immediate moment to have a bearing on the problems of practical medicine. This might serve if these sciences would only stand still, but progressing as they are with tremendous rapidity, the knowledge of to-day may be obsolete to-morrow, and the facts and methods which now seem most remotely theoretical may be of the most immediate practical importance in the near future. The practice of medicine is applied science, and consists in the application of the principles, facts and methods of physics, chemistry, anatomy, physiology, bacteriology, pharmacology and pathology, to the study and treatment of the diseases and accidents of the living body. In the pursuit of any applied science the only logical method of procedure is to master first the fundamental facts and principles of these sciences; then, and then only, can one intelligently comprehend their application to the specific problems of medicine. Fundamentally the chemistry which the physician must know is the same as that required by the metallurgist, the analytical chemist, the pharmacist or one in any other vocation into which chemistry enters. It is only in the application of chemistry along these special lines that the methods differ. If the physician is to have a ground work in chemistry which will enable him to keep abreast with the advances in his profession, he must so master the general subject that he will be able to keep in touch with the progress in chemistry, to read its literature intelligently and to apply its frequent new discoveries in his daily work. And these statements apply with equal truth to anatomy, physiology, and the other fundamental branches.

The physician trained in such a school is sure to be intolerant of many of the abuses which have so long disgraced the American medical profession. The manner in which the profession has sold itself—nay, given itself away, to the manufacturing pharmacist, prescribing and endorsing a host of proprietary preparations of whose composition he is ignorant, is one of the most disgraceful and humiliating incidents of our profession. These enterprising manufacturers must laugh in their sleeves as they contemplate the facility with which they have induced physicians to advance their purely selfish commercial purposes by establishing their nostrums, by the petty bribery of free samples, and of blotters, pencils, paperweights, and sundry other advertising gew-gaws. It is high time that we ceased to permit these arrogant gentlemen to be our therapeutic mentors. No truly scientific physician will ever prescribe a preparation unless he knows positively its exact working formula, nor is there any sufficient reason for his prescribing any combination which is protected by a trade name. Departure from this strict rule of professional integrity and self-respect has proven a boomerang in not a few instances, when the manufacturer, his nostrum thoroughly advertised to the public as en-

dorsed by the physician, has proceeded to assure them that his panacea was all-sufficient and that its use would enable the patient to dispense with the expensive services of perhaps the very physician who had recommended it.

Our medical literature, so much of which is anything but creditable, will be greatly purified and elevated when the profession consists of broadly educated men with discriminating judgment who will not tolerate the flabby, unscientific stuff which now makes up so large a portion of it. In this connection, may I urge the importance of a careful selection of the medical journals which will constitute a large and important part of your mental pabulum throughout your active lives. Shun the organs of the manufacturing pharmacist, or those which devote themselves mainly to the exploiting of proprietary remedies. Do not choose a journal because of its low subscription price—good medical literature, like anything else which is of good quality, must command a reasonable price and is ever the cheapest investment. If you are in doubt as to what are really the best journals, seek the advice of some older, and scientific practitioner, but by all means start out in your professional career by reading journals which are worth your while. Unfortunately, this class is not a very numerous one and the selection will not be difficult. You will find it of advantage to keep in touch with the purely scientific side of medicine by reading at least one journal devoted to anatomy or physiology, to bacteriology, or pathology, or such one of these fundamental branches as most interests you.

And lastly, may I suggest that you may with the greatest advantage start out in the career you have chosen, as an investigator, putting into practice the ideals and methods of research, and training yourselves by their daily exercise. In the early days of your practical life, when you will be blessed or troubled by few patients, select some topic in anatomy, histology, physiology, or any other department of your choice and devote a portion of each day to its pursuit. The number of such problems is legion, and abundant material for study will lie at your hand, no matter where you may locate. In the selection of the topic and the conduct of your research those who have taught you here will be delighted to assist and to advise you.

Later, as clinical cases come to you, these will naturally become, at least in part, the objects of your researches, but the training you have acquired in the pursuit of the simpler problems, where the factors were few, and more readily grouped and controlled, will be sure to make you more painstaking, thorough and scientific in your clinical work. You will have formed the habit of seeking out exhaustively every fact which can have any possible bearing on the case, of recording these observations accurately and of deducing your conclusions only when this has been done. Clinical observations so made and recorded are scientific data, and furnish the best possible material for real contributions to medical literature. Time can be found for such work even in the midst of an arduous practice if one will only order his time systematically. It is the greatest and busiest men who do find time for these things. One of the great surgeons of the world laid the foundations for his splendid career by experimental research while conducting an extremely arduous and time-consuming country practice. Robert Koch was a country practitioner when he discovered the bacillus of tuberculosis. Such investigation, even though the topic

be small and simple, serves to keep one in touch with the scientific side of medicine, and a worthy and familiar associate with the greatest men in its ranks.

Gentlemen of the graduating class, as a fellow-physician, I welcome you to the ranks of the great profession of medicine. You enter its active life at a very interesting epoch. While the profession is overcrowded there is always room at the top; never was there greater need and demand for earnest, faithful, properly trained workers. Great things have been accomplished in medicine in the last quarter century, great work is being done to-day and the immediate future is pregnant with yet greater possibilities. I wish for you the fullest measure of participation in the magnificent activity which is all about us, and the achievement of the largest possible success.

## Original Articles

### AINHUM.

WITH REPORT OF A CASE.

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Ainhum, from the Nagos native name, meaning "to saw," may be defined as a pathologic process, the ultimate result of which is a spontaneous amputation of one or more fingers or toes, usually the little toe. This occurs through a slow but gradual circular strangulation. The disease when unchecked inevitably leads to loss of one or more fingers or toes. Generally only the little toes are affected, but cases occur in which other toes are attacked and amputated.

#### HISTORY OF THE DISEASE.

The affection was first described by Clark,<sup>1</sup> and later by Da Silva Lima<sup>2</sup> of Bahia in 1866, who gave to the medical world the first complete reports of this strange malady. It was at first supposed to be confined exclusively to Brazilian territory. Since then, however, it has been reported from nearly every quarter of the globe. It has been met with most frequently on the western coast of Africa, in Brazil and in India. It is also reported from Egypt, Trinidad, Buenos Ayres and other parts of the world. The affection occurs most frequently in the negro, although cases are reported in Arabs, Musselmen and Chinese. In the United States the disease has been met with most unfrequently and I am able to find in our literature not over twenty cases reported of this strange affliction.

All these cases have occurred in negroes. Hornaday<sup>3</sup> reported a case in a negress from North Carolina; Horwitz<sup>4</sup> of Philadelphia and Shepherd<sup>5</sup> of Canada found cases in negroes. Evans<sup>6</sup> reports a case in a negro, aged 72, at Darlington, S. C.; Dr. R. H. Days of Baton Rouge, La., had a case in a negress, and Dr. J. L. Deslates, also of Louisiana, reports four cases occurring in St. James' Parish. Another case is re-

ported from the Emergency Hospital of Washington, D. C., and Matas<sup>7</sup> and Isadore Dyer<sup>8</sup> of New Orleans have written extensively on cases observed in that city. Hyde and Montgomery, Stelwagon,<sup>9</sup> and others have also reported cases. So rare, then, is this disease in the United States that the records show scarcely over a dozen cases; and yet the disease is so prevalent in India that Crawford found a case in every 2000 surgical cases at the Indian hospitals. The absence of pain or inconvenience in many instances, doubtless, keeps the number of cases reported few and far between; moreover, we must take into consideration the fact that the class of persons afflicted with ainhum are seldom brought in contact with medical men. Thus it happened that in my case, complete amputation of one toe and almost complete amputation of another had manifested itself before the patient sought relief or obtained knowledge of his condition.

#### SYMPTOMATOLOGY.

The disease begins almost invariably with a crack or fissure at the root of the little toe on the plantar or inner side. It may occur on one foot only, or in both feet simultaneously, or it may affect one foot after the other, as in my case. The groove, once started,

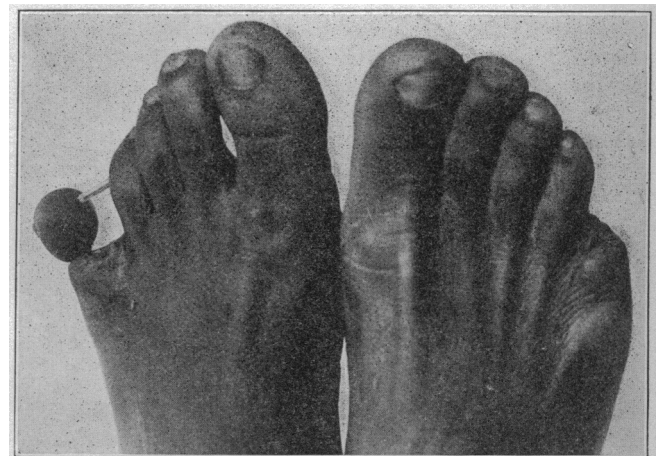


Fig. 1.—Ainhum. Case of Dr. Nelson D. Brayton's, March 1905. Spontaneous amputation of little toe on right foot. Little toe on left foot almost severed. Characteristic tumefaction and enlargement of the ball-like portions beyond constricting band.

deepens and extends gradually around the whole circumference of the toe. As the groove deepens, generally without ulceration, bleeding, or discomfort to the patient, the distal portion of the toe enlarges and may swell to twice its normal size. It becomes rounded and ball-like in appearance and may be even wider transversely than anteroposteriorly. After a varying period of time, ranging from two to ten years, the phalanx is absorbed, the blood vessels become obliterated and the toe drops off. Pain is never a marked symptom unless it occurs incidental to the liability to injury to which the dangling and now everted toe is exposed. The pain may also occur as a result of the swelling and edema of the constricted part. There may be an erythematous eruption accompanying the constriction or the ulceration due to traumatism in the latter stage of the disease. These ulcers, if they do not show a tendency to ready healing, may become quite pain-

1. Clark: Trans. Epidemiology Soc., London, 1860.

2. Da Silva Lima: American Arch. of Derm., 1880, p. 357.

3. Hornaday: Trans. Med. Soc. of North Carolina, 1881, vol. xxviii, pp. 76-78.

4. Horwitz: Med. and Surg. Reporter, Phila., 1887, vol. lvi, p. 649.

5. Shepherd: Amer. Jour. Med. Science, Phila., 1887, vol. xciii, p. 137-140.

6. Evans: Trans. Med. Assoc. of South Carolina, Charleston, 1887, p. 93.

7. Matas: New Orleans Med. and Surg. Jour., vol. xvi, p. 603; and Trans. Amer. Surg. Assoc., 1896, vol. xiv.

8. Dyer: Reference Handbook Med. Science, vol. 1.

9. Stelwagon: "Text-book on Diseases of the Skin."