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FURTHER REFLECTIONS OF A MEDICAL TEACHER*

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The occasion brings to my mind an address which I heard, not in this noble hall, but in the building on the corner of St. Paul and Saratoga streets, nearly forty years ago. I had just graduated at the Maryland University, was working in the laboratory of Newell Martin in the Johns Hopkins University, and had come under the spell of the man and the place. The address by S. Weir Mitchell, a name equally renowned in medicine and literature, both in the subject matter and the grace of expression, made a deep and lasting impression on me. I very well remember the general subject concerned the renewal of the tissues, particularly the nervous tissue, after too great wear, and he showed the importance of exactly determining, not so much the nature of the disease as the condition of the diseased individual. He spoke also of the use of rational, but not necessarily pharmacologic, remedies, among which rest occupied a prominent place, to assist in the restoration to the normal. It was a view of disease which the medical student at that time did not have revealed to him, but which has now become fully recognized. I regret that I cannot hope to say anything that will be so remembered.

Some years ago, and the years now pass with such accelerating rapidity that the period seems remote, I gave an address entitled "Reflections of a Medical Teacher." Now, having attained greater age, a wider experience having given more material to reflect on, and having possibly wasted much time in reflection, to which I always devote a very delightful ten minutes after breakfast, I propose to speak to you today "On Some Further Reflections of a Medical Teacher." I find that my reflections follow along much the same lines as in the former address, though the views expressed there have in some cases undergone some alteration and repair, and in others have become deeper and stronger.

In teaching one is concerned, first, with the material, just as a farmer must consider first the character of the soil he tills; virgin soil, moreover, rarely presents itself to his hand; his fields have been tilled by previous possessors, sometimes the process enhancing, often injuring, the quality of the land, and what he does is influenced by the previous culture. Continuing the agricultural simile, we are secondly concerned with the tiller, his selection and training and his ability for his

job. The third point is what sort of a crop he wishes to produce, and the fourth, what methods of culture he pursues.

During the thirty-five years of my life as a teacher I have come into pretty close relations with a large number of young men from all parts of this country, and a few from foreign countries, of the average age of over twenty-three, and representing all kinds, both as to degree and quality of intellectual tillage. It seems almost absurd and indicative of a very faulty method in our educational system that these men should not earlier acquire the training which is supposed to fit them for the serious work of life.

While this is not the time when we should regard everything in the German system, as judged by some of the activities resulting therefrom, as worthy of imitation, nevertheless the difference in the character of the early education in Germany as compared with ours is striking, and I think not in our favor. Some years ago while visiting a friend in Germany I had the opportunity of seeing something of the German method at close range. The son, a vigorous youngster of 15 who was shortly to enter the gymnasium, spent in school thirty-four hours weekly, this including two hours of field-work in botany and two hours of religious instruction. In addition to this, he spent two hours daily in the evening in preparation. In the gymnasium the drill is fully as strenuous, and when the boy leaves this to enter the university he is fully two and a half years ahead of an American boy of a corresponding age; his education has been conducted along rigid lines and is thorough.

The boy spoken of had a fair knowledge of French and English and had been drilled in Latin to an extent that he was able to carry on a conversation with his father in that language. In history he was thoroughly steeped in that of the German Empire from the Treitsche point of view, but of the wider aspects of history he had little. His point of view had been absolutely formed for him and he had imbibed the Treitsche principles as a part of the sermon on the mount. What particularly interested me was his outdoor education, as revealed in the course of a long tramp we had together in the mountains, and which he had acquired as a part of his school-work. He knew the plants, the trees, the geology and topography of the country, the traditions and history associated with the region, and with and through this knowledge had acquired a love of home and country which we rarely see. Of athletics, he had the gymnastic drill in the school, which seemed to keep his body in good condition.

The religious instruction was obligatory, but there was a choice between the Roman Catholic and the Protestant point of view. The father talked to me seriously about the choice, and had concluded, not

* Address delivered before the Medical and Chirurgical Faculty of Maryland.

from the point of view of conviction, but from that of the material advantage to his son, that, since he might possibly enter into the Austrian service, it would be better for him to choose the Roman Catholic side. Of course the disadvantages of such a system as this, in which the boy at the period of lasting impression is rigidly trained in a system which has the state and not the individual primarily in view, are sufficiently obvious, but these disadvantages are not necessarily associated with the system. There is no reason why the historical and political instruction should not be as free as the botanical.

My reflections have led me to believe that it is in these early years that our educational system is most defective and will be most difficult to remedy. In contrast with this German boy, I think also of another friend's son, a boy with whom I was accustomed to talk when on my way to a club, where at stray times I endeavored to play golf. The boy, 16 years of age, pursuing his studies at a private school which prepared boys for college, played a fair game of golf and could talk of the game with some degree of interest, but knew nothing of its historical development or of the physical principles involved in its pursuit. Apart from a very superficial knowledge of one form of athletics, he seemed to have acquired little or nothing; indeed, I could not ascertain that he had ever voluntarily read a book. This early education is of vital interest to the teachers of medicine, for, in the first place, the age period at which men enter into medicine must be lowered, and the colleges can not turn out men with the training we require from the material they receive. There would seem to be hope in the large private schools of the country, but none of these could exist if they made adequate demands on their students, and there is, furthermore, a lack of properly qualified teachers.

There is no profession of teaching in this country and there are no rewards, either pecuniary or in position, on which such a profession could be based. Even in the private schools teachers are selected rather on a basis of athletics and social qualifications than on the ability to train and inspire youth. The possession of a "Ph.D." is also regarded as one of the desirable qualifications of a teacher; it looks well in school catalogues and certainly should not be held to be detrimental, but the character of work which the degree demands in no way qualifies a man to teach. How much better it would be for him to spend the time under a competent master in the study and practical exercise of teaching. Every one engaged in the tillage of the soil must study its character.

During a part of my teaching career my class included both those who had passed through college and had acquired the A.B. degree and those who entered the school after fulfilling certain more or less definite entrance requirements. Harvard having required the A.B. degree as a condition for entrance into the medical school since 1900,¹ my experience has been more extensive with students who have the degree. As far as I have been able to learn by careful study of results, on the whole the A.B. men are the better. In judging the material of college training one cannot say offhand whether the better material which comes from the college is due entirely to the training received there. The college has a certain advantage in

that its material represents a selection. It embraces the congenital rich; others whose immediate forebears by the exercise of energy and thrift have accumulated sufficient means to give their sons a college course; and a large number of young men who by great sacrifices and hard work earn the money necessary.

On the whole, the hereditary element also will favor the college man. There are differences in environment of the three classes, so many advantages and disadvantages connected with each, that I am not sure whether it is better for a young man to select his great grandfather to meet his college expenses, or to place the burden upon the thrifty father, or to depend on his own efforts. I found also in my previous inquiry that there was little difference in the best men whether they had or had not the degree, but the average was cut down by the poor men, who were most numerous in those without the degree. Much depends on how the years which the college represents have been passed, and one can easily see ways in which they may be spent as advantageously or more so than in college. A man, however, does acquire in college certain traits difficult to characterize affecting his human relations and of advantage to his future career in any line whatever.

As I look back on my life and the friends I have made, many of them having attained distinction, I find that a large proportion have not had the college degree. It must be remembered, however, that the attainment of the college degree is becoming progressively more easy and that most of these men at present would have gone through college.

I have been greatly impressed with the evidence which college men often present of a lack of thoroughness in the instruction they have received. After two or more years of study of French and German, for instance, they have acquired no facility in the use of the language. They are also incapable of close and accurate observation and show a singular lack of facility and clearness of description. This comes out strikingly in one of the exercises of my course, in which the students are required to study under the microscope sections of diseased tissues with which they are not familiar and to give written descriptions of the conditions present. I have been reading these papers now for many years, each year with a hope that is continually disappointed, for it is difficult to believe that an education of twenty-three years can show so little effect. One learns almost to classify the students by the chirography. This is for the most part indistinct, without character, often only the beginning of a word written out, leaving the remainder to be guessed at. The matter is badly expressed, often obscure, diffuse and too voluminous. The greatest lack is an unfamiliarity with the methods which even the savage would use to obtain knowledge of an object. The method of analysis, the resolution of a problem into its single components, the study of these and the reassembling must be taught over and over again. A boy should in the beginning be taught to write legibly and to express himself clearly and succinctly. The only use students seem to know of books is to obtain by study the knowledge which is recorded within their pages, not to expand the knowledge they have acquired by the study of nature. They seem to have but little enthusiasm, little curiosity to know. Certainly a large part of a student's first years in a medical school is taken up with acquiring methods of study.

1. This has recently been modified to the extent that two years of college work are accepted, provided the standing of the student be high and the instruction of a certain character.

I remember that in a discussion on the subject of the desirableness of modifying to some extent the A.B. requirement a well-known professor of psychology objected to the proposition on the ground that the college degree indicated the possession of culture and that the lack of this desirable commodity would place the medical profession at a disadvantage as compared with the law, for the lawyers would have the degree and culture. It is possible to define culture as a state of mind which enables its possessor to recognize, appreciate and enjoy the best product of man's work in any direction, whether in literature, art or science. Culture is acquired, who can say how. Often when not consciously sought, and often when sought, it flees the pursuer. It is probably more often associated with the A.B. degree than not, and in the class seeking the college, heredity and environment are fully as important elements of culture as the college course. Certainly, as far as culture involves a knowledge and appreciation of literature the college men often seem to lack this part of it.²

The men, on the whole, are conscientious; they try to work, but they are childish and those methods of instruction which are unfortunately most used in the primary schools make the strongest appeal to them. They prefer assigned lessons, textbook recitations, and what are termed "quizzes" on lectures. I am accustomed each year, at the termination of the course, to ask of the class a criticism of both the matter taught and the method. Occasionally I have gotten very admirable, well-considered reports, containing suggestions which have been adopted with advantage. As a stimulus to the class I have been excusing from examination at the end those men who have shown excellence as determined by the weekly written work. This year the students have asked that this method be discontinued, on the ground that if no examination is given they would miss the valuable review made necessary in preparing for the examination. Of course what I have said does not apply to the entire class, a large number of whom are all that could be desired as students, since those giving the impression of the normal are probably not sufficiently considered in estimating the average, for after all, the abnormal makes the greater impression.

I have thought that something might be learned from a statistical inquiry regarding the colleges where the men were educated previous to their entry into the school. To this end I have gone over the graduating classes of the last ten years, taken the standing of the men while in the school and compared this with the colleges. Previously I had made the same inquiry based on the standing of the students in pathology alone. The results are similar. The number of educational institutions represented, 105, seems to be all-

embracing, but of these, sixty-two gave us but one student apiece, and thirteen but two each. Occasionally the single representative of a college is an exceedingly good man, but the general average from these colleges is low. Most of our men come from the well-known colleges in New England, Harvard of course leading. These men all averaged very closely, there being a difference of only 3.86 per cent. in the standing between the highest and the lowest. Whether such a small figure has much meaning is doubtful, although the numbers were sufficient as to do away with the effect of very low and very high standing of individuals. The sectarian colleges fell 7.27 below the average of the New England nonsectarian colleges, but the whole average was not so marked as in pathology alone. Here again it is difficult to say that the character of the education received in the sectarian college is alone responsible, for the college population in these is largely represented by a race which, though abounding in admirable qualities, has not been prolific in the production of men of science.

The unfortunately small number of men whom we have received from the New England institutes of technology averages a little better than those from the colleges, one institute being 3.1 better. It is rather interesting that the product of all these institutions should average so closely, but the methods of teaching are similar in each, and the men who go into medicine are fairly representative of the product. The inquiry also considered relative standing of the men from the different parts of the country. The men from New England were so greatly in excess to give but little value to the result. As compared with the other localities represented, however, New England stood 1.92 higher.

I still remain one of those who believe that teaching is a calling which if engaged in should be the paramount interest in life, that it is a responsible, serious and noble calling, and I regret the tendency which seems to prevail of disregarding teaching as a career. I have become aware of this in several ways. Numbers of men from my laboratory, after serving as assistants for about two years, have taken positions elsewhere. In the inquiries for men from other institutions, the ability to teach, and this means much both in the way of natural qualifications and training, is seldom inquired into, or at least little stress is laid upon it in the list of accomplishments demanded for small pay.

The young men themselves in seeking positions make very definite demands as to the hours which are to be devoted to teaching. Their ideal seems to be a life devoted to research. Why not research with teaching? Research is of fundamental importance for the teacher; the knowledge which he acquires from the study of nature is living, it is his very own and he can give it, together with the inspiration which has directed his search. What a change has taken place in the point of view of teaching and research during the past forty years. Research has now become dominant; it gives the individual pecuniary reward, place and position; it gives the institution reputation and endowments. It has been possible to apply the knowledge which has come from research to the prolongation of life, to the alleviation of human misery; this knowledge has also made habitable large and productive regions of the earth by the destruction of endemic diseases, and has in many ways enormously increased man's power in the use of the natural forces. Its

2. It is of course not to be commended that a lecturer on a medical subject should garnish his discourse with classical allusions, but it sometimes is difficult to avoid it and the result is apt to be disappointing. I remember that once when beginning some lectures on malformations it seemed to me eminently appropriate to begin the course by reading the first chapter of *Tristram Shandy*. This is amusing, interesting and instructive in that it gives an example of an abnormal course of development being initiated by the simple question which was propounded by Mrs. Shandy. As I proceeded to read the chapter an expression of utter bewilderment came over the faces, and I am sure that the bearing of Mrs. Shandy's question was entirely lost. On another occasion it seemed to me that it might be well to introduce the subject by some allusion to Greek mythology, by showing that such conceptions as the Cyclops, the Janus and Cerberus could never have arisen as a creation of the imagination, but were based on the existence of these forms in the malformations. It is very difficult to speak of the Cyclops without mentioning Polyphemus, and at the name the expression of bewilderment I have so often seen passed over the faces. After the first experience I asked one of the assistants if he had ever read *Tristram Shandy*, and he said he didn't remember, but he probably had, for he read many books when a child.

pursuit conduces to pleasure and the joy of life; other pleasures pale in contrast with that which the worker experiences when the solution of a problem to which he has given concentrated effort appears at hand. This it seems to me is the real fascination which research exerts, and when this is combined with rewards so much greater than can be obtained by teaching it cannot be wondered that it makes the stronger claim.

Individuals who have amassed fabulous wealth by measures which really seem simple, provided the natural endowment which makes possible their exclusive pursuit is at hand, have been led to apply parts of this wealth to the creation of institutes for research. Scientific research is a curious plant; it flourishes alike in the stony desert and in the hot-houses; it is largely independent of environment and sometimes does not well bear transplantation. Under this stimulus to research, affecting the individual, the university, and the institute, it has enormously developed, to the extent that no one can keep pace with the literature in a single main subject. It is comparatively easy to increase quantity of a product, but the increase of quality is not so easy. To some of us the expression of organization of research, its creation at any spot under any circumstances, provided pecuniary means are at hand, seems rather shocking; it is true that the output of poetry and painting under such conditions might be greatly increased, but there might be some fear as to its quality. Poetry is useful to man; it has undoubtedly contributed to his happiness and has even alleviated human misery; but no magnate has ever made the experiment, which would be a very interesting one, of the creation of an institute to increase the output of this desirable product, of which the world at present is in great need.

These enormously endowed institutes can put out such a mass of research, and the primary and often sole measure is volume, that the university as a place where knowledge is advanced suffers in comparison. The institutes, moreover, attract young men in the most fertile periods of life, and offer greater emolument than the university, and freedom from what is too often regarded as the drudgery of teaching. The university, in comparison, falls somewhat behind in public esteem, and particularly so in that the institute is not disposed to hide its activities behind a modest veil. It must tell the public its accomplishments, because Croesus seeks to justify his appropriation of wealth by devoting some of it to a useful purpose. The university also seeks to meet this competition of the institute by increasing its volume of research output, and in various ways seeks to inform the public of its activities.

One leading university in the country goes so far in this direction as to publish the titles of the papers of all who have been in any way connected with it, no matter where the work was done, thus claiming that through the one time association of the author with the university this has in some way stimulated the production. The university has also created positions almost exclusively for research, which is very unfair to its teaching force, for there is too great a tendency to judge men solely by the standard of volume of output. The university has its place in training the individual by research and otherwise, toward the development of the best that is in him. The institute fills a proper place in providing facilities for research, and

there are always those who will find there a suitable environment.

Teaching, however, should not be, and never has been, a bar to research, for student and teacher should seek knowledge together, and pedagogy involves so much of the unknown that to engage conscientiously in it is a form of research. Many of the great teachers I have known have been both teachers and investigators, and in both directions stimulating. There is too great a tendency to regard research and publication as synonymous. It is a laudable reputation to be known as a contributor to knowledge, and while teaching may impede publication, it is, if properly pursued, a stimulus to research. There are rewards, intangible, it is true, but the more valuable, which come to the teacher only. Who of us cannot remember certain teachers who have exerted an influence lasting through life, which has in some way made us better men?

It is difficult to attempt to define what should be the relation between teaching and research. There is at present an undoubted tendency to the separation of the two. Everything favors the man who holds research as an exclusive ideal and makes teaching a secondary consideration. There are men of wide vision, ingenious in devising methods, of great power of concentration, who are able to single out sharply the definite problems in a subject and follow them to the end, and who should find in the institute facilities for work. These men are not teachers, they aim not toward the higher development of the younger men, but regard them solely from the point of view of additional hands and eyes. They are ambitious, eager for reputation, inclined to insist on priority claims, and generally have a pretty high appreciation of their general excellence and the quality of their work. There are also men of wide culture, equally qualified for research, who are also great teachers and who teach through research. They have broader sympathies, the entire atmosphere about them is different, and even greater than their contributions to knowledge is the influence which they exert on their students. These men belong in the universities; they will find there the more congenial atmosphere, and when these rare individuals appear the university must even at the sacrifice of other things secure them and make their path easy. Teaching may also favorably affect research. A man who has made important contributions to knowledge as the head of a department in which the teaching is of the highest character told me that he finds in the review of the entire subject which the yearly course demands ever a new stimulus and fresh suggestions for the problems on which he is working.

There is another condition which one dislikes to mention and which is undoubtedly operative in the selection of teachers in a university. The university, recognizing that the salaries which it can afford to pay are not sufficient to render the recipients contented in the social environment which the position gives, rather seeks men who possess private means. That is, other things being equal, the man with private means will secure the position. It is true that the salaries given are sufficient for simple living and for family life, provided this is not too greatly extended; true also that food can be carefully selected and restricted to nutritive amounts and that the women of the household will be much happier in household employment than in social diversions; that public schools are very much better than private schools for

the children, and, if so placed, that a pension is available after retirement, and the teacher need not in his life fear starvation. It is, however, equally true that he cannot make these obvious truths recognized and accepted by the family. Discontent, unhappiness with impairment of usefulness and loss of ideals too often result.

It would be infinitely better if universities could be placed in a wilderness and withdrawn from the environment of idleness and wealth. Simple tennis courts and even golf courses could be created, provided the ideals of the games were not perverted by the courts and links which wealth provides. The women would undoubtedly find great diversion in the study of each other and in simple occupations. Not only this, but since the university gives to society much more than it receives, outsiders would probably pay a good deal for temporary admission into the Utopia, and thus might be made to contribute to the funds of the university. Such conditions are partly fulfilled in one of the great universities of America, but I was not able to find that the social atmosphere differed a great deal, and that the air was always calm. The trouble seemed to be that there were a few servants available and friction was excited by these being stolen from the temporarily happy possessors.

What is the end sought in medical training? It is easy to say that it shall fit men to be of service in all the relations of man to disease. This concerns the prevention of disease, the medical and surgical care, the social factors involved, and the human relations of the diseased individual. It is impossible that all these can be fully united in the same individual, but they are all based upon knowledge and this can be attained only through the methods of science. It is obvious that for this medical service a great many different kinds of medical men will be required and it remains a question how early their differentiation should begin. Men will be needed in the public service to prevent disease and to take care of the sick. This public service has only begun, but is sure, with the establishment of sickness insurance and other forms of social legislation in which sickness is a factor, to become prominent. It will require men well trained both in the measures of preventive medicine and in the medical care of the sick. At the present time the sick are most uneconomically cared for; a large part of the sickness could be prevented and the care of the sick is to a great extent inefficient and far too costly. With economic conditions as they are, and there is little prospect of change, the earnings of 80 per cent. of the families in the country do not suffice for much to be devoted toward recompensing medical services. In the cities this condition is met by free medical service in the hospitals and by the charity of physicians.

In the country districts, and it is here that the social medical service is most needed, it is not provided for at all save in certain sections. Factories, mines, railroads and other large employers of labor, find it to their advantage to provide an organized medical service. Ultimately the state must in some way provide a proper medical service in country communities for those who are not able to pay. The schools must provide men suitable for such positions; they should be well trained in preventive medicine and capable of teaching the people the principles of right living. Such physicians should be able to meet successfully medical and the simpler forms of surgical disease and to see that patients with the more serious and complicated

diseases are sent to hospitals established at centers, the number of such centers depending on the relation of population to area.

There must be provided capable surgeons. This demands a long course of training, extending over years, in a well-ordered surgical clinic. The exercise of the surgical art to obtain the best results in the more serious operations demands well-skilled assistants and attendants. The operations demanded are comparatively few and such surgical clinics may be established at the hospital centers. Highly trained medical men, internists, must be provided, men who are specially skilled in the cure of the diseases of children, obstetricians and specialists, and, finally, men whose work will lie exclusively in the care of the 20 per cent. for whom illness is often a sad pleasure, men who understand inherited constitutions, fat reduction, and the mysteries of high finance.³ Above all, teachers must be provided.

Can all this be accomplished by a medical school? Yes, provided the age period of entrance be shortened and the premedical education be better adapted to the medical needs. All medical measures are based upon knowledge obtained by our senses, assisted by methods and instruments which extend their power. There are many facts which can be acquired as such, but disease always presents problems to be solved. It depends on so many factors which are often ill understood, which are variable in themselves and in the effect which they produce on the individual. Disease, as the physician sees it, affects not classes, but individuals, and the individual case is always a problem. The mere matter of diagnosis, as far as naming the pathologic process and ascertaining its situation, is to be regarded as comparatively easy, although every pathologist is aware of the number and the importance of the mistakes which are made. In disease certain conditions which bring about functional disturbance are produced and life goes on under conditions which differ from the normal. One of the distinguishing criteria of living matter is its variability, of which individuality is the expression, and the result of the abnormal environment of disease must differ in every individual. The condition of the diseased individual, on which rational procedures of relief are based, cannot be ascertained from previous experience or from the experience of others or from generalizations, but must be deduced from the investigation of the individual. There is no other road to the knowledge which gives power.

Medical education must provide that the main facts of the structure and function of the body shall be firmly acquired, and also constant exercise in the study of disease and practice in methods. One of the most important elements should be the recognition of knowledge and its separation from conjecture. This last, of course, is making pretty large demands on the system, but something might be done at it. The essential of the education in the medical school is the labora-

3. Lest too many should be attracted into this class of physicians, it must be remembered that there are obvious disadvantages associated with the practice. The life is a dull one, tending to intellectual decline, and the competition with Christian Science and various forms of medical cults is keen. A new element seems at present to have entered into the competition in Boston. A Chinese herb doctor, endowed with preternatural skill in feeling the pulse and diagnosing conditions thereby, who prescribes vegetable substances by the bag, is acquiring to himself the most lucrative practice in the Back Bay. It has not proved possible to remove this competition by legislative enactment, and with the opening of the door of China to let in the West, more of the Chinese doctors may escape to bring into this country competition with Chinese medicine. I mention this as a danger which has not been foreseen by those who are seeking to introduce western medicine into China.

tory, a place which affords facilities for the study of things and phenomena, and in which the student can be trained in the use of his senses and in the use of instruments by which the power of the senses is increased. In all the departments, in the clinics, in the hospital wards, the method is the same. In the early or preclinical studies the laboratory method is of the utmost importance, for it is there that the foundation must be formed. It necessitates teachers who can stimulate and extend to the students the enthusiasm in the pursuit of knowledge which they possess. With the students as we receive them a large number of teachers, at least one to twenty, are required, for the students are not sufficiently developed to work independently. The situation is unfortunate, moreover, in that the more help is given the students the more they require. Their previous education in some mysterious way, but effectively, has robbed them of the capacity of self-dependence. The unit system devised by Minot, in which the laboratory is divided into units, each consisting of a group of students under one instructor, would be admirable provided a sufficient number of capable instructors could be obtained. The absence of subdivisions enables the better teachers to be more fully used. Nor can the laboratory be a place for teaching alone, it must have an atmosphere, and knowledge must be sought within its walls by both teacher and student.

The lecture is an important part of teaching, provided its function is understood. It should not be used as a substitute for objective study, but to expand and coordinate the knowledge which the student has already acquired. It must also interest and stimulate. The lecturer must have a present and vital interest in the matter considered, and this demands a continual renewal. Once, early in my career, I wrote out with great care a series of lectures, and said at the end: "There, that job is finished, I can read these lectures with some slight additions year after year." I read them once, then again, and had I been obliged to read them a third time I should have sought another occupation. Curiously enough, I heard of them long afterwards. At a certain function I met a prematurely old man whose hard struggle with the world had left marks upon him, who told me how much as a student he had enjoyed those early lectures, that he had obtained a shorthand copy of them, and had made them the basis of his practice. In another way I became aware that copies were in existence. I was testifying in a medicolegal case, sharing in the plunder which the law extracts from the community, when the astute counsel from the other side—and the law compels a witness to be on one side or the other—interrupted with the remark, "but you said otherwise," and he proceeded to read to judge and jury extracts from a well-used and rather dirty book which he said I had written. It was the lectures again, and I was obliged to give the court a dissertation on the subject of lectures, and included a charge for this in the fee which the soulless corporation afterward paid.

One gains an interesting experience from lecturing. However good may be the descriptive power of the lecturer, however able he may be in interesting his audience, it is useless to attempt to give in a lecture information on a complex subject. For instance, I doubt if it would be possible for a lecturer, taking a group of men of the average intelligence, but coming from a world in which there were no trees, to enable them in an hour to form such a conception of an oak

or elm that they could go out from the lecture and instantly recognize such a tree. I have arrived at this view from personal experience which may not be complimentary; I have endeavored to ascertain from students before whom I had lectured on a topic in which I was certainly interested, and they seemed to be, how much correct information they had acquired, and have found it surprisingly small in amount.

The lecture should also convey a stimulus to the student, and the lecture hour should form an agreeable interruption of the laboratory work. Unless the student can gain in the lecture mental recreation and stimulation, the lecture had better be left out, although it may have aspects which are not usually regarded as among its assets. One is its power of inducing gentle, refreshing, noiseless sleep in the audience, and the other is the educational value of the lecture to the lecturer. To one who is a poor sleeper there comes a great satisfaction to see sleep descend upon an audience. The lecturer experiences an exhilaration at the demonstration of the possession of a power which makes him akin to the God "who giveth his beloved sleep." I always insist that the sleep shall be noiseless, and position makes lecture room sleep usually of this character. The lecture has its value to the teacher also. How often the crudity of an idea becomes strongly apparent when the attempt is made in the lecture to convey the idea to others. How often have I seen a culdesac open before me, with walls so high that they could not be carried even by a flight of eloquence, and into which I was on the verge of a headlong plunge! How eagerly is a friendly alley utilized as a means of escape! The teacher should find in the lecture a means of clarifying his knowledge, and in the stimulus of lecturing, very often new and useful points of view present themselves.

Next to the lecture, in ascending value, comes the demonstration, also a method of value, but of over-rated value. It is possible to gather a few men, not more than ten, around certain objects, point out the essential things, and enable them to see them as does the demonstrator. Such a demonstration can also be made the basis of an informal talk, and questions can be asked, but at the best it is little more than a projection of the ideas of the demonstrator.

Oral recitation—I greatly dislike the word quiz—by the class is also a valuable exercise provided it can be given in such a way as to bring out the conceptions which the student has formed and to correct those which are faulty. It is too apt to degenerate into a lecture or into a dry matter of question and answer. The student must also be shown how to use books properly and be referred to original sources of information.

The absence of teachers might be helped out by the aid of student instructors, for teaching is a most valuable discipline for the student. The limit of time, the pressure of the work would necessitate the student giving an additional year to the course, and the low esteem in which the teacher is held would limit the choice to those in need of the small pecuniary recompense that could be offered.

The education of the medical student so vaguely suggested should give a basis on which he can further develop the various forms of medical service.

The profession of medicine is a career full of interest, the social position of medical men is on the whole good, there is a general feeling of fellowship and comaraderie among them, fostered by frequent meet-

ings in societies. It is an eminently live profession, for knowledge is constantly growing and the opportunities for service are greater than in perhaps any other. Service involves also the element of combat, for there is a constant struggle against ignorance. All this attracts men to it. On the other hand, it is at present very greatly overstocked, the income to be derived from its exercise is small and failure is easy. No man can hope to succeed in it without industry, good mental endowment and without the possession of the quality of mind which recognizes, appreciates and seeks knowledge. To all this might well be added that he must have interest in and sympathy with his fellow man.

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THE RELATION OF GOUT TO NEPHRITIS

AS SHOWN BY THE URIC ACID OF THE BLOOD*

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Under the stimulus of the recently developed methods for quantitatively determining the uric acid of the blood, renewed interest has been shown in the diagnosis of gout, based on a retention of uric acid. From the normal variations of from 2 to 3 mg. per hundred

Since gout, uncomplicated by nephritis, is characterized by an abnormally high uric acid concentration in the blood without any corresponding increase in the concentrations of other nitrogenous waste products, such as urea and creatinin, it would appear possible to eliminate the nephritic factor readily by obtaining normal values for the urea and creatinin of the blood. However, we have accumulated considerable evidence indicating that in the development of interstitial nephritis, uric acid is the first to be retained, this being followed by retention of urea and, lastly, of creatinin.³ It is conceivable, therefore, that at an early stage in the progress of this type of nephritis, a blood examination would show retention of uric acid only, the concentrations of urea and creatinin being normal. This, it will be recalled, is precisely the blood picture regarded as characteristic of gout.

In the accompanying table are recorded two groups of cases, the first composed of five cases giving the typical classical histories of gout, and the second consisting of seven cases with some evidence of incipient nephritis, such as slight albuminuria, cylindruria or diminished phenolsulphonephthalein output. These patients all subsisted on a purin-free diet several days before the examinations were made. The first two cases of the first group, in addition to giving the typical histories of gout, also show one or more of these signs of nephritis, and from this point of view might be classed in the second group.

The blood analysis in Group 1 may be regarded as typical for gout, and those in Group 2 are what might

BLOOD PICTURES IN GOUT AND EARLY INTERSTITIAL NEPHRITIS*

Date 1915-1916	Case	Age	Sex†	Diagnosis	Uric Acid, Mg. per 100 C.c.	Urea N, Mg. per 100 C.c.	Creat- inin, Mg. per 100 C.c.	Phthal- ein 2 Hrs. per Cent.	Systolic Blood Pressure	Urine	
										Albumin	Casts
9/ 3	M. K.	49	♀	Typical gout.....	9.5	13	1.1	48	230	+	—
10/ 5	T. B.	57	♂		8.4	12	2.2	35	164	—	+
3/24	H. L.	51	♂		7.8	12	2.9	59	120	—	—
10/ 6	L. J.	43	♂		7.2	17	2.4	..	200	—	—
10/ 6	C. P.	45	♂		6.8	14	1.7	..	...		
3/31	B. D.	25	♀	Miscellaneous	7.7	20	2.6	45	168	++	—
6/ 7	D. S.	56	♂	cases	6.7	19	2.5	26	185	—	—
3/20	F. V.	14	♀	Showing some	6.3	12	3.6	32	120	++	+
3/28	H. B.	55	♂	evidence of	6.1	16	2.8	57	120	—	+
3/23	H. J.	50	♂	early	6.0	18	2.9	36	140	+	+
3/14	G. C.	40	♂	interstitial	5.5	15	2.1	46	147	—	+
3/22	M. S.	46	♀	nephritis	5.0	12	2.5	52	190	+	+

* Normal findings: Uric acid, from 2 to 3 mg.; urea N, from 12 to 15 mg.; creatinin, from 1 to 2.5 mg.

† In this column, ♂ denotes male, and ♀ female.

c.c. of blood, the uric acid concentrations may be increased to as much as from 4 to 9 mg. in gout. Such increases are common occurrences in gout, but it does not follow, conversely, that these uric acid accumulations are infallible signs of gout. That uric acid, as well as urea, may be retained in nephritis was pointed out many years ago by Garrod,¹ this observation being recently confirmed by more exact methods.² It becomes essential, therefore, to eliminate the nephritic element as a factor in the retention of uric acid before the latter can be regarded as an indication of gout.

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* Read before the Section on Medicine, New York Academy of Medicine, April 18, 1916.

1. Garrod, A. B.: Observations on Certain Pathological Conditions of the Blood and Urine in Gout, Rheumatism and Bright's Disease, *Med. Chir. Tr.*, 1848, xxxi, 83. Von Jaksch, R.: Beitrag zur Kenntnis der Uriacidaemie der Nephritiker, *Zentralbl. f. inn. Med.*, 1896, xvii, 545. Von Noorden, C.: Metabolism and Practical Medicine, 1907, iii, 669.

2. Folin, O., and Denis, W.: *Jour. Biol. Chem.*, 1913, xiv, 29; *ibid.*, 1914, xvii, 487.

be anticipated in very early interstitial nephritis, if our views regarding the order of retention of nitrogenous substances in nephritis may be accepted. The striking similarity in the blood pictures in the two groups is at once apparent.

Very close scrutiny does, indeed, indicate a tendency for the urea and creatinin concentrations of Group 2 to rise above those of Group 1. The differences, however, are slight. The uric acid figures for the first group average higher than those of the second group. Nevertheless, many cases of gout have been reported⁴ with blood uric acid concentrations as low as or lower than the lowest in Group 2.

The data here presented raise the questions: 1. Is gout merely a stage in the development of interstitial

3. Myers, V. C., and Fine, M. S., with the cooperation of Lough, W. G.: The Significance of the Uric Acid, Urea and Creatinin of the Blood in Nephritis, *Arch. Int. Med.*, April, 1916, p. 570.

4. Folin, O., and Denis, W.: *Jour. Biol. Chem.*, 1913, xiv, 40; *Arch. Int. Med.*, 1915, xvi, 35.