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THE NEED OF MORE WELL-TRAINED PRACTITIONERS OF MEDICINE

DURING the past year SCIENCE has published a number of very interesting and instructive articles on medical education. However, in reading these articles carefully, the thought struck me that not one of them touches upon the most vital question of all, namely, Are the medical schools of this country to-day preparing their students primarily and principally for the services which the citizens of this country need most? Personally, my answer is, No. I fully realize that this is a rather bold statement to make and one with which some very well-qualified educators will take sharp issue, and yet I believe it is absolutely true. My opinion is based on an extensive experience with a large number of recent graduates—graduates from many of the more prominent and some of the less prominent schools of the country. The old adage, "the proof of the pudding is in the eating," is apropos here. The only way to determine definitely whether a medical curriculum, ever so carefully worked out on paper, produces the desired result is to see the recent graduates in action at the bedside. Judged by this standard, I do not believe that the graduate of to-day, with all his fine scientific training, compares favorably as a general rule with the graduate of say twenty-five years ago whose training may have been a little less scientific but much more practical.

The purpose of medical education is to provide for the present and future citizens of the country the best medical care, service and attention that is possible under the circumstances, and judged by this standard, present-day medical education leaves much to be desired.

The country needs a relatively large number of well-trained general practitioners of medicine and a relatively small number of specialists, research workers and sanitarians; and yet the medical colleges are turning out ever-increasing numbers of the latter and relatively few of the former.

Two very interesting and extensive surveys, one by Dr. William A. Pusey, past president of the American Medical Association, and the other by a committee, headed by Dr. Matthias Nichol, Jr., have recently been made, both of which prove conclusively that in many rural sections of this country there is already a shortage of general practitioners of medicine and that there are almost no young men locating in the country. Space prevents printing the evi-

dence collected by them, but Dr. Pusey closes his article with the question: "But why elaborate on the shortage of physicians in rural districts when it is admitted?" and Dr. Nichol's committee reached the following conclusions:

(1) There is a universal tendency for physicians to abandon rural districts in favor of the cities.

(2) The number of those remaining belong in a very large proportion of cases to the older generations.

(3) There is little or no tendency for recent graduates to seek practice outside the large centers of population.

(4) In hundreds of rural districts, medical care is most inadequate or absolutely lacking.

One of the reasons why the medical student of to-day is so poorly prepared for the general practice of medicine when he graduates is because most of the teaching in medical schools is being done by non-medical teachers and specialists. My contention is that fully 90 per cent. of all human ills can be best treated by well-trained general practitioners. If this is true, the students should be prepared for the general practice of medicine instead of for the specialties, sanitary service and research work. Every undergraduate medical student should first of all be given the opportunity to become an efficient general practitioner. Education for the specialties should be left to the properly constituted postgraduate medical schools and hospitals.

At the very outset, let us stress the point that in medicine there is and can be no adequate substitute for practical experience and the larger and more varied this is the better.

Foot troubles are admittedly the cause of much discomfort and loss of efficiency and yet I doubt whether one recent graduate in a hundred knows the fundamental requirements of a well-fitting shoe. If he does not know this, how can he advise a patient in the selection of shoes or how can he relieve the more common and simple foot troubles? He has spent many weary hours learning things of relatively little practical value, but he has not been taught how to properly treat a septic infection of the hand or even a finger, how to efficiently treat a simple cold or to handle the first patient who comes to him with a minor injury, such as a scalp wound, in such an efficient and business-like manner as to inspire confidence.

Research workers are born and then trained; they are not made at random out of all comers. Only an infinitesimal percentage of the general run of medical students will ever discover anything really worth while and these must and will find themselves. What would you think of a farmer who would try to make a race horse of every colt born on the place? I believe you would think of such a one just about what I think of a medical dean or a medical faculty or a system of medical education which trains most of its students for specialists and research workers when the country needs general practitioners. Research work done by most research workers is of very little value and often worse than useless because utterly impractical and because it clutters up an already too voluminous medical literature.

I have been told of a medical dean who asks every prospective professor and instructor, "What research work have you done?" As one of the questions to be asked of a future member of the faculty, there can be no objection, providing the research work is carefully looked over and the dean is convinced that it has been really worth while and not merely rubbish. As a matter of fact, this precaution is rarely taken and the fact that some research work has been done is put down to the credit of the applicant, while often the quality is so poor that it should be put down on the debit side of the ledger. This overvaluing research work, irrespective of its actual worth, is one of the bad things we have taken from German universities. During the years 1896 and 1897, 1904 and 1905, I spent two years in postgraduate work in the universities and hospitals of Austria and Germany and during that period became intimately acquainted with a considerable number of splendid young and middle-aged medical men. Quite a number of them told me that it was practically impossible to get any hospital or university advancement unless they turned out some original work and that the advancement did not depend upon the quality of the original work done but largely upon the time and energy expended. In 1905, I bought a book on "Proctoscopy" in which the investigator reported his findings of the proctoscopic examination of one hundred normal individuals. More than twenty pages of this book are devoted to a study and description of such things as the normal variations of the superficial veins of the lower bowel, as seen with the proctoscope, a study of no more value than if a botanist should pick a hundred normal white oak leaves at random and describe the variations of their contours. The book of 133 pages could have been condensed into a dozen pages and have had everything in it of any practical—yes, even scientific value—and yet that book was at least partly responsible for the author's advancement in the university to which he was attached. But why refer to all this? Simply for the purpose of showing that faculty members thus selected are not qualified to teach students the things they need to know in order to become competent general practitioners.

A more important question to be asked in selecting new members of the faculty of an undergraduate medical school would be: "How much actual personal experience in the general practice of medicine have you had?" Only men of this type can give the medical student who expects to enter the general practice of medicine the training which he most needs and should have, yes, and must have if he is to be efficient and successful. While there can be no objection to an occasional pure scientist on the medical faculty, the number of non-medical teachers has increased to a point where it actually seriously interferes with proper medical education. Who would want to learn how to fly from an instructor who had never flown himself? The really efficient general practitioner needs to know a thousand and one things that make for efficiency, that give comfort and relief to his patient, which the non-medical teachers and specialists can not possibly teach because they do not know these important things themselves.

Overspecialization is a really serious menace to medical progress, and specialization which begins during the undergraduate student's medical education is to be unequivocally condemned. A man who does nothing but remove tonsils may become technically expert in this operation, but unless he has a good background of general medical education and general practical experience he is not even a safe tonsillectomist because he lacks the experience and knowledge requisite to tell him when the patient's general condition is such as to make even so simple an operation as that safe, or what to do and to do promptly should some unforeseen complication arise. A man who does routinely only one operation day after day and has never done anything else is no more a physician in the best sense of that term than a man is a mechanic who does nothing but fasten bolt No. 349 on Ford cars day after day and year after year. The latter type of near mechanic is excusable because a man of very limited intelligence can be secured for such work, but the pseudo physician of the former type is certainly not to be encouraged.

For the past fifty years, Sweden has probably had the highest educational requirements for the degree of doctor of medicine of any country in the world and yet the Swedish people have not had the best medical service, not because their medical men have not been highly educated, but because their number has been inadequate. During the past thirty years, I have personally examined and written the histories of a great many Swedish patients, who came to this country as young men and women, and have come across a goodly number who came from the rural districts of Sweden who had gone through a variety of illnesses and who never had the care and attention of a physician or a dentist. I remember writing the history of one who left Sweden at the age of twenty who had had a number of children's diseases, also typhoid fever followed by osteomyelitis, who during all these had never had a physician—in fact, had never met a physician. Sweden has tried to solve the problem of its medical shortage by licensing Feldschers—men with ordinary common school education and a year's course in minor surgery and bandaging—who are permitted to treat minor surgical cases.

We may be perfectly sure that the rank and file of the American people are going to have medical care when they think they need it, and if the medical colleges of this country do not provide reasonably competent physicians in adequate numbers to fill their needs, the people will prevail upon the legislators of the various states to let down the bars and in that event just how far they will be let down nobody can foretell. During the past session of the Illinois legislature, the profession of the state went through a very strenuous fight to prevent the passage of a law for a special examining board of chiropractors for the licensing of chiropractors and another law to permit all osteopaths to practice all branches of the healing art, irrespective of their training or rather lack of training. If in addition to the underdog and medical monopoly insinuations and the rest of the emotional appeals always introduced at these legislative hearings, the champions of the osteopaths and chiropractors, and there were many such, had been able to demonstrate a serious shortage of regular physicians in any portion of the state, these bills would probably now be laws. All osteopaths would be permitted to practice medicine and surgery in all its branches and the chiropractors would have their own board of examiners to determine who should have a license to practice, and then our splendid medical practice act could no longer protect the public against quacks and charlatans and might as well be repealed, for the protection of the public is about the only legitimate excuse for any medical practice act.

It might facilitate the unraveling of this problem if we dealt with it in the same way that the practicing physician deals with the problems presented to him for solution by each patient who comes to him for advice. First, he tries to make a diagnosis, finds out what is actually the matter with the patient; then determines the etiology, discovers what causes the variations from the normal; then outlines the treatment, advises the patient what to do for the relief

of the condition; then makes a prognosis, determines what the outlook for the future may be.

So far, we have devoted our time to the diagnosis and etiology and have come to the conclusion that there is an impending shortage of well-trained general practitioners of medicine which we believe is very largely the direct result of our present system of medical education:

(1) Our medical students are not being trained for the general practice of medicine.

(2) The medical course is so long and consequently expensive in time and money that from a financial standpoint graduates can ill afford to practice in sparsely settled districts with necessarily limited possibility for financial returns.

(3) It has been shown that country boys are attending medical colleges in relatively smaller numbers than formerly and for the one who does, the long residence in a university center or a large city has usually weaned him from the country, has so citified him that he has aversion for the country, and often has so sissified him that he no longer has the courage to strike out on his own hook away from laboratories, hospitals and consultants. This is a much larger element than most of us realize. The indecision, the feeling of dependency, the lack of courage of the senior interne who is about to be thrust out from the tender and loving care of his Alma Mater and metropolitan hospital is often pitiful to behold.

Recent articles in various medical journals are proof of the fact that medical men all over the country are beginning to think seriously about these problems and that many of them have reached the same conclusions we have. In the June, 1924, number of the *Illinois State Medical Journal,* my presidential address to the seventy-fourth annual meeting of the Illinois State Medical Society on medical education was published. This address was along lines similar to the above. Shortly after its publication a good many commendatory personal letters, some of them from utter strangers, came to my desk, and to show how widespread the feeling of unrest is, I am going to quote from three of these letters. No. 1, from a general practitioner in Michigan who graduated from a Class A school, class of 1919, with two years' interneship in a standardized hospital and three years' experience in general practice:

I received the two pamphlets you sent me a few days ago and I have read them with a great deal of interest. Everything you say in your paper on medical education is true. I can tell you, Doctor, that a young man going out into the general practice of medicine has a good deal to learn which should have been taught him, but was not while in school. The schools try to be ultra-scientific, but they would accomplish more if they prepared their students for the general practice of medicine instead of for the specialties. The professors would have a great deal to learn should they try to do general practice.

No. 2, a rural practitioner from Missouri:

I have just read your article on medical education in the June number of the *Illinois State Medical Journal.* Though I am a total stranger to you, I can't help telling you that you have "hit the nail on the head." I have read your last set of conclusions at the close of the article and I consider it the "handwriting on the wall" for the medics and a "future" for the cultists.

No. 3 from a professor of international reputation:

I have just read with a great deal of pleasure your address on medical education. I agree with what you say *in toto.* Something has gone wrong with medical education. I have been teaching for thirty-five years and have watched the medical students graduate, receive their licenses and practice medicine, and in spite of the wonderful facilities for teaching with which Class A medical schools have been equipped, the graduates of the last ten years are very generally not as good general practitioners as before that period. Of course, there are exceptions. At the present time, they do not receive sufficient instruction from men in general practice who have had clinical experience and know how to teach.

REQUIREMENTS SUGGESTED FOR THE PRACTICE OF MEDICINE

Accredited high school education.

Two years useful, character-building and judgment-forming work if possible under the guidance of an able general practitioner.

Four years intensely practical medical education.

One year interne service.

This would materially shorten the time and greatly reduce the expense of a medical education.

Those who mistake length of time spent in college for efficient training will immediately repeat the slogan, "We can not and must not lower the standards of medical education." No sensible person wants to lower the standard. It is just this that we wish to forestall. If all the useless things with which the student's mind is now burdened were eliminated and only the practical things were taught to a class of serious minded mature students according to the above suggestions, such graduates would actually be much better prepared to practice medicine than are most of the graduates taught by the system now in vogue. First of all, we need a much larger number of teachers who have had clinical experience, and, second, we need a different type of text-books. The greatest medical teacher is not necessarily he who knows the greatest number of scientific facts, but he who can impart to his students the greatest amount of useful, practical information in the least possible time. The most helpful medical text-book is not necessarily the one with the most pages and finest illustrations, but the one with the greatest amount of useful, applicable, easily assimilable in-

formation with the least padding and rubbish. As one writer has well said, "Abolish long lectures on rare conditions, intricate operations and complicated procedures and devote more time to common diseases and minor ailments." The waste of the student's time and energy, two of his most precious assets, on non-essentials is nothing short of scandalous.

In this connection it may be well to remind ourselves that, after all, most of the ills for which patients consult their physicians are minor ones, easily diagnosed and easily relieved if the right remedies are applied.

To illustrate the above and also the general fact that profound learning often has less value in medicine than simple practical knowledge, I wish to cite the following case history: Recently I operated on a young lady for a simple recurrent appendicitis. On making my evening rounds she was in good condition and reasonably comfortable. She was left under the care of the interne and a trained nurse for the night. The next morning her nurse reported that the patient had had little or no sleep because of persistent hiccough. The interne, a recent graduate from one of our most up-to-date scientific universities and medical schools, had not been able to relieve this distressing symptom. He is thoroughly familiar with the theory as to reflex irritation causing singultus, with the nerve tracts along which these impulses are supposed to travel and unduly impressed with the seriousness of this symptom, but not familiar with the simple household remedy that will promptly relieve at least 90 per cent. of all cases of hiccough. If he had been, the patient need not have had a sleepless night. At my direction the patient was given half a teaspoonful of granulated sugar on which ten drops of ordinary vinegar was dropped just as she took it, and that was the last of her discomfort. Let this illustration suffice. If space permitted I could give many illustrations of the above two points.

What medicine needs is not so much more facts as a proper correlation of the facts already known. As things stand to-day the undergraduate student is fairly overwhelmed with facts, the great majority of which are of little practical value. What we need is not more research workers to discover new facts but a few great medical minds who can take the great number of facts already known, separate the non-essential from the essential, arrange and classify them properly so that the latter can be more easily gotten hold of by the student. What we need even more than this is a larger number of medical teachers who can and will teach medical students the essentials of medicine in the shortest possible time without cluttering up their minds with a lot of non-essentials, so that we may have a larger and larger percentage of graduates ready, willing and able to supply the people with efficient medical service for their common ordinary ills, a service which is quite as important and quite as necessary as any that can be rendered to society.

One of the tragedies of life, not infrequently met with, is the case of a young man who has spent eight or ten years preparing for a professional career only to find that he is entirely unsuited for it, either temperamentally or otherwise, or that for some reason he fairly detests it. Some who find themselves thus situated assuage their sorrow and disappointment by marrying rich heiresses and are then usually permanently lost to medicine or any other life of service. The rest flounder along never satisfied and never satisfactory. This could all be very largely avoided if during the two years when they are accumulating practical experience and some of the wherewithal with which to pursue their medical studies, the medical student would spend his leisure time doing systematic reading along medical lines under the guidance of a competent medical practitioner and be permitted to visit patients with such a one, help him some in his work, much after the fashion of the old preceptor system. In this way he would have an opportunity to test his fitness and adaptability for the profession before spending many years and much money, only later often to discover his mistake. The above scheme would give the student a chance to develop the habit of application and industry, to get some practical experience in life with an opportunity to develop judgment and resourcefulness and persistence, things the present-day graduate needs so sorely. It would give him two years of earnings with which to pursue his medical studies and would make it possible for country boys to again enter the medical profession in greater numbers. It would also let the student finish his undergraduate studies by the time he is about twenty-five years of age. If he would now associate himself with an older, busy general practitioner for a couple of years he would be in a position to be a much more useful member of society than is the average graduate of to-day because he would better supply the needs of the times.

THE PROGNOSIS

(1) There is little or no hope for relief from the Council of Medical Education and Hospitals of the American Medical Association or from the faculties of the majority of our medical colleges.

(2) The president of one of the large universities seems to realize the difficulty and has promised relief. We sincerely hope he will not rest until he has solved

this difficult problem and that then other medical colleges will promptly follow his lead. Thinking medical men with large general experience and laymen who realize the need could materially aid matters by disseminating information along these lines.

(3) If a solution is not found and found promptly, we will soon have a shortage of well-trained general practitioners of medicine and in that event quacks and cultists will almost surely receive legislative sanction, and they and other poorly trained persons will take over some of the important functions now performed by the general practitioner. If this happens incalculable injury to the public is bound to result.

The problem of medical education is such an important one because the kind of medical education the undergraduate students of to-day receive will determine very largely the quality of medical service which the citizens of this country will receive from ten to forty years hence.

THREE POSTULATES

Next to the stability of government, honesty of administration and the general intelligence of the people, the welfare of the nation depends more upon the quality of medical service which is rendered to the people than upon any other one thing.

The longevity, health, efficiency and happiness of the people depend more upon the integrity, ability and industry of its medical profession than upon anything else.

The allied professions of medicine, dentistry and pharmacy are to-day giving the American people the best all-around medical service that any nation has ever had in the history of the world, and that by men very largely trained according to the system above proposed.

If the three above postulates are true, and we believe they are, it is the plain duty of those who see the matter as we do to strive incessantly until medical colleges are again rendering the service to the public for which they were primarily organized—namely, to supply an adequate number of well-trained general practitioners of medicine.

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DOCTORATES CONFERRED IN THE SCIENCES BY AMERICAN UNIVERSITIES, 1922–1925[1]

THE Research Information Service of the National Research Council, through the courtesy of the various American universities granting the doctor's degree, has compiled annually since 1919–20 a classified list of the theses of the recipients of this degree in the sciences, with a table showing the comparative statistics for the last ten years. (From 1921–22 through 1922–23, the data for the arts were included, but these were dropped in 1923–24 as too voluminous a compilation of material and as outside the scope of the council's activities.)

The compilations for the first three years were published,[2] but since 1923 the amount of space required has made it impossible to present the data in printed form.

The following tables give the statistical analysis, by university and by subject, of the doctorates conferred during the past ten years. The list of the theses is on file in the Research Information Service and information regarding them will be furnished on request.[3]

The total number of doctorates granted continues to grow slowly, the increase during the years 1923–1925 being much less than during the preceding three years, during which time the universities were recovering from the war period. The totals, however, are much larger than those of the pre-war period. That interest in higher education is greater than ever before is clearly indicated by the following table, which gives the total number of doctorates granted by year during the past twenty-five years. The number in 1925 is almost exactly six times that of 1900.

1900	102	1909	194	1918	293
1901	127	1910	180	1919	180
1902	103	1911	239	1920	325
1903	134	1912	273	1921	334
1904	129	1913	234	1922	442
1905	143	1914	244	1923	572
1906	140	1915	314	1924	597
1907	143	1916	336	1925	621
1908	184	1917	372		

It is interesting to note that Chicago, which has held the lead in sciences for many years, now gives way to Wisconsin. During the past two years eleven universities have granted twenty or more doctorates, and eighteen, ten or more.

Chemistry maintains a very considerable lead over any other science. This is undoubtedly due to the many ramifications of the subject, both scientific and industrial. During the past year ten universities

[1] Compiled by Research Information Service, National Research Council.

[2] SCIENCE, 52: 478–83, 514–7 (1920); 55: 271–9 (1922); *School and Society*, 17: 57–63, 106–9, 132–9 (1923).

[3] Statistics regarding the doctorates in chemistry and a list of dissertations covering the period 1922–23 to 1924–25 will appear in the *Journal of Chemical Education*.