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## **MODERN TENDENCIES IN MEDICAL EDUCATION \***

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In choosing for discussion this evening the topic "Modern tendencies in medical education" it is my purpose to take the opportunity to answer in some detail a number of questions put to me during the past year by both physicians and laymen in visits to the School of Tropical Medicine. These questions indicate on the part of the public not only a deep interest in the School,—its activities, purposes, etc—, but also in the broad field of medical education.

One of the commonest questions asked me has been, "Does the School offer regular medical courses?" When I reply that this is a School for graduates and not for undergraduates, there often follows the query, "Why has Porto Rico no regular medical school?" My answer that she can not afford it, furthermore, that she can get along very well without one, brings the further question, "Why is it, then, that many small countries or states with fewer people and less money have medical schools?" To this I say, "Most such states do not have real medical schools; they have something they call medical schools. They would do better to follow Porto Rico's example, and send their young men elsewhere for training."

It is easy to see how such a conversation leads naturally into a discussion of why medical schools have become so expensive; why they require five to ten or even twenty times as much money as they did twenty-five years ago. The intelligent layman may well point out that his own physician,—a man of fifty years, whom he considers the best in the city—, was graduated from a second-rate school twenty-five years ago. He is sure his doctor is more competent than many of our young men trained in our costly modern schools. And it may be added parenthetically that several of the most noted medical scientists of the United States graduated from schools that were considered poor even 25 years ago and would hardly be given

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a class-C rating today. The answer to this paradox is easy: exceptional men will rise to the top in spite of the handicap of poor education. Indeed, the handicap itself in the case of some of our older physicians proved an advantage by driving them to seek post-graduate instruction in Europe where between 1875 and 1900, or even later, the standards of medical teaching were far higher than in the United States. Then, too, we must not forget that a man's education does not stop when he graduates. The able fifty-year old physician of today to whom I referred above, has had twenty-five years more of study and experience than the young man. He ought to be more competent than his young colleague even though the latter has the advantage of a better formal training. We must admit that, unfortunately, many of our physicians do not continue to study after they graduate, so that they are often not as well qualified to practice as the young graduate.

You will gather from these few remarks that the first tendency in modern medical education, which I wish to emphasize tonight, is *the raising of the standards of instruction*. A modern medical school must have not only adequate buildings, well-equipped laboratories, a big library, and a teaching hospital under its control, but also professors, assistants and technicians all especially trained in their respective fields. For the fundamental branches at least there must be full-time teachers, men who can dedicate themselves entirely to their classes and to research. This tendency to betterment has been more marked in the United States than in any country of the world since 1900 chiefly because our standards thirty years ago were among the lowest. There were at that time nearly 200 medical schools in the United States, a large proportion of which were of the proprietary type, that is, they were run to make money directly or indirectly for their owners, who were often the professors themselves, and they naturally did not spend much on laboratories, libraries, technicians and such other necessities of the modern school. The proprietary school has almost disappeared (there are only eighty medical schools in the United States now, and ninety per cent of these are rated Class A), though to our shame several diploma mills still exist owing to the lax laws of a few of our states. The "business" of making doctors, however, is becoming unprofitable since so many state examining boards, including that of Porto Rico, I am glad to say, will not grant a license to any doctor who is graduated from a second-class school. I have heard of individual cases where this strict ruling caused a hardship, since, as I pointed out above, a man may be a competent physician in spite of poor instruction.

But the principle followed by our medical boards in this matter is sound; and any young man who deliberately chooses to go to a second-rate school today, has only himself to blame for his handicap.

I have said that the low-class proprietary schools are disappearing rapidly from the United States. What about other countries? In England, Germany and France such schools never existed. Also in Latin American the proprietary medical school has never developed. But so far as the quality of instruction is concerned many of the government-supported schools of Latin America are very little better than the proprietary schools which flourished in the United States twenty-five years ago. Indeed we may say that in the matter of medical education Latin America is just beginning to wake up from a prolonged sleep. I could mention several countries of Central and South America where the sleep continues.

I will illustrate with a single example. A country, which we shall call X, with a population of 3 million people, has a single medical school in which there are some 240 students. The fifteen professors, all busy practitioners, are required to give only 3 one-hour lectures a week. A few assistants give about the same amount of time. There are no laboratories worthy of the name, no technicians, not a single teacher in the fundamental sciences who had any special training in his subject. It is not surprising that the entire budget for this medical school is less than \$20,000 a year. The average cost of sixty-three medical schools in the United States for which records are available, is approximately \$180,000 a year, while the schools of highest standing have annual budgets of over \$300,000. But it may be suggested that the cost of living is not so high in the country I cited as in the United States. As a matter of fact the cost of everything needed to make a modern medical school, namely, adequate buildings, proper equipment and trained men, costs more in X than in New York. And this is true of most educational centers in Latin America.

On the other hand I should like to tell you of a country to the south of us, or rather a state, which has waked up medically. I refer to the State of São Paulo, Brazil, where I spent nearly three years. That state is now spending over a million dollars in the construction of a teaching hospital; it has received another million dollars (approximately) from the Rockefeller Foundation for laboratories and library. The Rockefeller gift was made with the understanding that the state would maintain the school as a modern scientific medical center, with full-time teachers for all pre-clinical

branches. The annual budget of this institution is now over \$300,000, while the student enrollment is limited to some 400. In other words the cost per student is nearly \$800 a year, which is about the average for the better schools of the United States.

Now you see why I said Porto Rico could not afford a regular medical school. The people here, and particularly the medical fraternity, have advanced too far to be content with such a school as that in the republic of X, which it could easily have at \$20,000 a year. Of course if some rich man were to donate ten or fifteen million dollars for adequate *buildings* and *endowment* for both school and teaching hospital, it could be done. It is clear that our Government can not at the present time afford the necessary expenditures.

This leads me to point out a second tendency in medical education, namely, *the increasing interest of philanthropists in promoting medical progress*, both research and teaching. The phenomenon is more marked in the United States than in any other country of the world today. This is partly due to our great wealth, but that is not the whole explanation. Both the rich and those of small means have acquired the habit of giving to a degree not seen in any other country so far as I know. A Brazilian medical professor who visited the United States last year said in a speech on his return to Bahia that the thing which impressed him most in North America was this widespread private philanthropy. He added that in Brazil, hospitals, schools and most other institutions had to depend on the government for everything. It has been my impression that Porto Rico is a little more like Brazil than like Continental United States in this particular, though the University of Porto Rico did receive at least two considerable donations last year, a very encouraging sign.

Another tendency of which I am reminded by this reference to philanthropists, is the increase in the *international spirit in medicine*. Of course science has always broken over national boundaries, but there is no doubt that in recent years the interchange of men and ideas in the medical world has been far greater than ever before, in spite of the post-war accentuation of the nationalist spirit in things political. The world war itself did much to bring America closer to Europe, and in the allied countries members of the medical scientific societies were among the first to extend again the hand of fellowship to their teutonic colleagues. Two years ago a Russian physiologist, one of the greatest of living physiologists, was not only invited to a medical congress in England, but had the rare distinction of being

made a special honorary guest. A fund was raised in the United States to do him a similar honor, and he came from England to America to attend another scientific meeting, and to visit various universities. The visit was not without incident. In going from Boston to New York the purse of gold which had just been presented to him was stolen, and when he arrived at his hotel in New York he found that his baggage had been carried off by a dishonest chauffeur. Another purse was quickly raised but the great scientist was not consoled, and is said to have remarked: "Please let me get back to bolshevik Russia where life and property are still reasonably safe." In spite of the unhappy incident, the visit no doubt did much to bring together the science of countries recently separated by war and revolution.

Several foundations, among which the Rockefeller is the most conspicuous, have contributed greatly toward the increase of the international spirit in medicine in the last ten years. They have done this in various ways,—by aiding in the development of medical centers in various parts of the world, (Peking, London, São Paulo and Brussels, are striking examples), by assisting governments in stamping out or controlling certain widespread transmissible diseases, by promoting the organization of schools of Public Health, and by giving travelling fellowships to medical professors and public-health officers. These fellowships, I might point out, enable those receiving them to spend one, two or three years in special study in that country which offers the best opportunities in the particular subject desired. There were more than 600 such fellowships given during the past year by the Rockefeller Foundation. One of these was to a Porto Rican, and this year we are represented again by one of our School of Tropical Medicine students who will spend two years in the United States studying Sanitary Engineering.

Another foundation is making it possible for a limited number of American professors, including those in medicine, to study in Europe, and the number of European medical men coming to the United States has enormously increased since the war. This is due partly, of course, to the greater opportunities which the United States now offers in the way of well-equipped and well-endowed laboratories and hospitals.

I wish to refer briefly to a tendency, particularly marked in the United States, to the *development of so called medical centers* (New York, Rochester, Chicago are examples) and to emphasize the co-

*operative spirit* which the movement represents. The name "medical center" signifies the bringing together in close physical relation the medical school with its class rooms, library, and laboratories, and general and special hospitals for teaching, all under a unified control. This control is generally exercised by a university. It is essentially the plan which Germany has followed for some fifty years. In the United States we are simply developing it more fully, as we are able to do with our greater resources. State control of most of the universities in Germany made the unification somewhat easier there than in the United States where many of our greatest universities, Columbia for example, are private institutions. Needless to say, the organization of such medical centers offers great possibilities. The strength of the cooperative spirit in these enterprises is illustrated by the fact that Columbia's medical center, to open next year, will be made up of at least eight institutions that were formerly quite independent. These institutions which include the Presbyterian Hospital, Babies' Hospital, Sloane Hospital for Women, Vanderbilt Clinic, and the New York Psychiatric Hospital, have voluntarily given up their independence in certain matters, including appointments, the trustees of each believing that a greater good can be accomplished by such a cooperative undertaking than by each institution working independently.

We have in our School here an almost unique example of cooperation in that two universities 1,400 miles apart and separated by an ocean have combined to develop a new special field of great promise.

Another tendency in modern medical education, possibly the most important development in recent years, is the increased emphasis which is being placed on *preventive medicine*; in practice this means the promotion of public health. To England must go the credit for pioneer work in this field, but the United States has made more rapid progress in the application of public-health principles in recent years than any other country. This partly explains why Porto Rico has developed a health department which beyond question is unequalled as respects completeness, and I believe also efficiency, in all Latin America, not even excepting that of the rich progressive state of São Paulo, Brazil, to which I have already referred.

Not only are students in medical schools being taught far more now about the prevention of disease than ever before but there are being organized special graduate schools of public health for training workers in this field. The School of Hygiene of Johns Hopkins Uni-

versity and the School of Public Health of Harvard, both endowed by the Rockefeller Foundation, have larger financial resources and larger teaching staffs than many first-class medical schools.

A similar school has just been opened in Toronto, Canada; another is under construction in London and there is projected still another in Paris. This movement is not limited to the training of doctors and public-health officials. It includes programs for the education of the public through the schools, newspapers, special bulletins, lectures, etc. As an example, I may mention that here in Porto Rico last year a series of teachers' conferences were held under the auspices of the Department of Health with the special object of giving the public by this means exact practical knowledge of how to prevent certain diseases prevalent on the Island.

A few days ago I read in the local newspaper about a discussion going on in Ponce over the question of using chlorine to purify the city's water supply. Apparently so many people were objecting to this method of purification that the mayor felt it necessary to call a meeting of the doctors that he might get their advice. I venture to predict that ten years from now, when your present high-school and University students who have had adequate courses in hygiene have reached places of leadership in the community such an incident will be impossible. These young men and women will know that the chemical purification of water is being practiced by the most advanced cities of the western world, that it has a scientific basis, that it is harmless, and that it has reduced the morbidity and mortality from intestinal infections to a remarkable degree. The relatively high death rate in France today is unquestionably due to the fact that that great country is still far behind Germany, England and the United States in the care of water supplies and in other public-health measures. Probably many of you hold the popular impression that the stationary population of France is due to her low birth rate. Strictly speaking, that is not true. The birth rate of France is almost as high as that of Germany or England. France's difficulty is in her *death rate* which is some forty per cent higher than her neighbor across the Rhine, and not in her birth rate.

But France is awakening to the vital importance of public health measures, and we shall undoubtedly see a striking fall in her death rate before many years.

In the beginning I referred to the fact that this was a graduate school of medicine; or as some prefer to say a post-graduate school. I wish to discuss briefly the question of post-graduate medical teaching, and some of the recent tendencies in that field.

There are at least two kinds of post-graduate teaching; or at least two kinds of post-graduate students. There is first the doctor who wishes to keep up with the newer advancements in medicine by going to some large medical center or university and taking a short course in his speciality, or if he is a general practitioner, in some subject which he thinks he needs most. Post-graduate students of this class are interested generally in clinical subjects, and they go usually to cities like New York, Chicago, Paris, Berlin and Vienna, where there is an abundance of clinical material. The schools which offer such courses often have a rather large element of commercialism in them. That is, the teaching may be a profitable business. I do not mean to depreciate such courses or the schools which offer them; they fill a very important need, but I wish to point out that true graduate teaching,—the second type referred to above,—is a different kind of thing. The true graduate student, in the university sense, is a man who comes not to get a quick review or to have pointed out to him a few new things, but to work leisurely, using the university's library and laboratories, under the guidance of its professors, with the object of increasing not only his own but the world's knowledge of some subject. He is essentially a research student. Of course most of the medical men who work in this way are or expect to be teachers and are generally interested in the fundamental medical sciences rather than in the clinical branches. But the number of men and women doing this kind of graduate study with the idea of becoming leaders in clinical medicine is increasing rapidly. There is no longer any sharp line between the laboratory man and the clinician. And the young doctor who aspires to a professorship of internal medicine, surgery or pediatrics, in any of our best medical schools must be not only an able practitioner, he must have proven himself an investigator; a true scientist, in other words. That is one of the outstanding tendencies in American medicine today. It is just the thing that put German medicine to the forefront in the twenty years before the world war.

From these few remarks it is evident that I consider there is no distinction between a true graduate school and a research institution. It is true that these are research institutes that offer no formal courses, but I know of no such institute that is not providing training for a certain number of people, who are graduate students whether so called or not. On the other hand every modern university is made up essentially of a group of research institutes. The fact that degrees are given in universities and not in places like



the Rockefeller Institute for Medical Research, is of no great importance. As a matter of fact many universities will readily give credits toward higher degrees for work done in approved research institutes. I am, of course, using the word "university" here to include only graduate departments. I do not consider colleges and normal schools as units of the university proper. They are mere appendages, retained for administrative convenience, though in young universities, such as ours, the appendages may be bigger than the body. At least one institution in the United States, Johns Hopkins, has recently decided to do away with its college department altogether. This may be the beginning of a very important movement.

What kind of post-graduate work does the School of Tropical Medicine offer? In spite of our limited resources we are trying to meet the needs of the two types of student which I mentioned; that is, of practicing physicians who wish to obtain in a short time systematic instruction in subjects related to tropical medicine and hygiene,—pathology, bacteriology, parasitology, chemistry, public health, transmissible diseases—and of those true university students who wish to work on special problems for the advancement of knowledge in these fields. Of our twenty-nine students last year, a majority belonged to the first class, though we had several including Father Palacios, and the members of the rickets commission who belonged to the second category. We had also several students of a third class, namely young men and women who were not graduates in medicine but who held bachelor's degrees in science or engineering and who wished to obtain the master's degree or the degree of doctor of philosophy in some field related to medicine. Certain of our courses are open to such students. As time goes on, however, I think we shall have more students of the investigative type. A doctor from the University of California will arrive in November to carry on a special study of amoebic dysentery. He has already made important studies on this disease. Another, a professor from the University of Chicago (two, in fact, for his wife, who is a Doctor of Science, is a collaborator) will arrive in January to study malaria. A group from the Rockefeller Institute, New York, may come down some time in the winter to study the influence of climate on the bacterial flora of the mouth, using the School as a base for their field work. Another prominent physician of New York State who has made important contributions to our knowledge of sprue is inquiring about the possibility of continuing his researches here. This type of student will do much to give the School a name in the scientific world.

The excellent opportunities here for investigations in tropical medicine and hygiene, we believe, will soon be recognized. We have not only a great variety of diseases—something no doubt our boosters' clubs would not like to advertise—but we have also here in our Department of Health an organization that makes it possible for investigators to carry out studies that would be difficult in many other places having an equally wide variety of diseases.

This School has another important function, namely that of serving as the center of medical culture for the Island. Our weekly scientific meetings (Thursday evening "seminars", and weekly clinics) give the profession here an opportunity for keeping in touch with medical progress such as few cities of the same size anywhere in the world can boast of. It may appear a little immodest in me to say this, but I know it is true. The credit is not mine except in so far as I have helped to organize the talent which the School has brought together. The attendance at our seminars during last year varied from fifteen to thirty five, showing a tendency to increase toward the end of the year. While the figures are encouraging, the fact that they were not higher suggests that there is here a need of such meetings rather than the contrary. It is a pretty general rule that the more we know in science the more we want to know. It is only the ignorant who are complacent.

I referred a few minutes ago to the fact that this School was an educational experiment in which two universities were cooperating. If successful, as the experienced leaders of both Universities believe it is going to be, the influence of the example will undoubtedly be very great. Already we can say that the initial success of the School was an important factor in making for a favorable report by the representative of the National Research Council on the establishment here of a graduate School of Tropical Agriculture, which is likewise planned to be a cooperative undertaking.

I pause here to say a few words about the opposition which nearly always arises when any such educational experiment is undertaken. There are generally a certain number of honest doubters, with logical reasons for their skepticism. There are nearly always a few whose conservative nature makes them oppose anything new. These we call "stand patters". Their motto is, "There is nothing new under the sun, and there must not be anything new under the sun." Then there are some who for one reason or another, are opposed to the particular project, or its plan of organization.

In organizing this School it was no doubt expected that these

several types of objectors or doubters would appear. But it was also expected, or at least hoped, by those of us who were later asked to assume the task of organization, that objectors of all types would show toward the new enterprise a spirit of good sportmanship; that is, if not helping by participation or by constructive criticism, they would at least stand aside and not attempt to interfere with the experiment by unfair criticism or obstructive tactics. That expectation, as many of you well know, has not been entirely realized.

On the other hand the support during our first year of that large majority who believed in the undertaking has been so manifest and so hearty that it has been easy to overlook the disappointing attitude of the few.

Our first year was in every way a success. We had more students than we expected; our organization was perfected more rapidly than was thought possible; our contacts with the public and the medical profession of the Island were wider than we anticipated, and though we had a financial deficit, it was small, considerably less than we figured it would be at the beginning of the year. We are just beginning to publish results of investigations carried on during the year. While not spectacular and mostly of the nature of surveys, they have brought to light facts of considerable importance, and have paved the way for taking up more specific problems.

Our second year is beginning auspiciously. While we look for no large number of students, inquiries have been numerous, and since the School is much better organized for both research and teaching than it was when we opened our doors a year ago we are sure the coming session is going to be a satisfying success. This splendid audience is in itself a good omen.

