

Dedication of Duke University School of Medicine  
and Duke Hospital

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Durham, North Carolina

April 20, 1931

*Reprinted from the Southern Medical Journal, Journal of the Southern Medical  
Association, Birmingham, Alabama, Vol. XXIV, No. 12,  
(December 1931), pages 1099-1124*

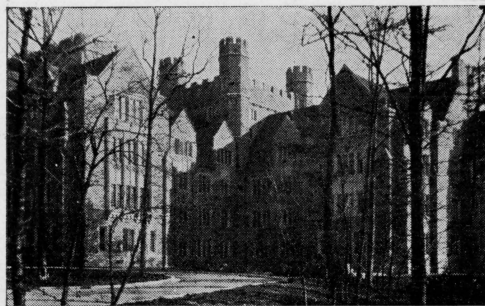


## Dedication of Duke University School of Medicine and Duke Hospital\*

### FOREWORD

The following pages are devoted to the dedicatory exercises which took place at the formal opening of the Duke University School of Medicine and the Duke Hospital in Durham, North Carolina, on April 20, 1931.

It is not necessary at this juncture to mention the years of work and planning of the late James Buchanan Duke, who made possible the establishment and maintenance of these institutions, nor of the burden placed upon those to whom he left the charge of bringing this undertaking to its present point of completion. The history, though brief, of the founding of the Duke University School of Medicine and the Duke Hospital, and the importance attached to their establishment and the widespread influence it is hoped this venture in medical education will have, may be gathered from the addresses of those who were closely associated with the growth of the physical side of these institutions and from those who have been actively engaged in medical education and the moulding of medical thought in this country.



Duke University School of Medicine and Duke Hospital,  
Durham, North Carolina

### PRESENTATION OF BUILDINGS\*

By GEORGE GARLAND ALLEN,  
President of the Trustees of the Duke Endowment  
and Chairman of the Building  
Committee.

Mr. James B. Duke, in the trust indenture of December 11, 1924, establishing The Duke Endowment, after making provisions for Duke University and various charitable objects, said, among other things regarding Duke University:

"I advise that the courses at this institution be arranged with special reference to the training of preachers, teachers, lawyers and physicians."

With reference to hospitals he said:

"I have selected hospitals as another of the principal objects of this trust because I recognize that they have become indispensable institutions, not only by way of ministering to the comfort of the sick but in increasing the efficiency of mankind and prolonging human life. The advance in the science of medicine growing out of discoveries, such as in the fields of bacteriology, chemistry and physics, and growing out of inventions such as the x-ray apparatus, make hospital facilities essential for obtaining the best results in the practice of medicine and surgery. So worthy do I deem the cause and so great do I deem the need that I very much hope that the people will see to it that adequate and convenient hospitals are assured in their respective communities."

In his will he bequeathed to The Duke Endowment the sum of \$10,000,000 to be administered for the benefit of Duke University, and with respect to a part of that sum I quote the phraseology from his will as follows:

"Said Trustees shall use and expend as soon as they reasonably can after the receipt of said sum not exceeding \$4,000,000 thereof in erecting and equipping, at the Duke University mentioned and described in said trust, buildings suitable for a medical school, hospital and nurses' home under the supervision of said Trustees and in all respects as they may determine concerning the same, and the acquisition of such lands, if any, as may be needed for such purposes, said lands, buildings

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\*EDITOR'S NOTE.—*Publication of these Dedicatory Exercises in the SOUTHERN MEDICAL JOURNAL is financed by a grant of funds from Duke University School of Medicine.*



and equipment to be conveyed to and thereafter belong to said Duke University and operated by it."

It now, therefore, becomes my great pleasure, on behalf of the Trustees of The Duke Endowment, into whose hands Mr. Duke committed this charge, to present to the Trustees of Duke University these Medical School and Hospital Buildings. Although Mr. Duke, who generously made possible the creation of these facilities, which will stand for generations to come as a testimonial to his deep love of humanity, is not present in body, unquestionably his spirit pervades this hall today, for did I not hear him say that he expected to be looking down upon this work one thousand years hence?

#### ACCEPTANCE OF THE BUILDINGS ON BEHALF OF THE TRUSTEES\*

By COLONEL JOHN FLETCHER BRUTON,  
President of the Board of Trustees.

Speaking for the Trustees, I accept the gift to Duke University of the structures erected by The Duke Endowment and just tendered in the name of the late James B. Duke for the use of the University School of Medicine and the Hospital. These buildings admittedly approach perfection in their construction and appointments. To the Trustees of The Duke Endowment unlimited praise is due and accorded for the painstaking service rendered by them. I beg to assure these gentlemen that their labors will not, cannot, be forgotten; for in their notably valuable, and yet self-effacing service, they have simply revealed the unerring judgment of our great benefactor in his selection of them as men who can do big things. This leads me to an inquiry:

Our benefactor—who was he? If we must judge by his commitments, it is safe to say that in some respects he was—just a man. In fact, this is revealed in the reading between the lines of a certain paper writing, recording after years of investigation and study his conclusions and commitments. It is clear that during these years more than once orphan children, some crying perhaps, some hungry, some laughing and singing, played about his knee; that in these

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years aged men and women, broken in the service of their father's God, were revealed to him as worthy of his remembrance; that on occasions he, in his imagination, visited hospitals and looked upon sick men, the beds whereon they lay, and upon those seeking admittance when there was no room. It is natural that these types should have appealed to him, because he was a man like you and me. The record shows that he made certain provision for them. It is interesting to note, however, that this provision was not absolute. Is it not true that little children, even orphans, grow into manhood and womanhood and sometimes forget; that old men and old women die and are forgotten; that sick men of the irresponsible class, if they get well, sometimes linger on as burdens to the state? There are those who do not thus reason, but I am tempted to believe that Mr. Duke did have some such thought. At any rate, we find him unsatisfied. To conclude with undertakings fenced about by human limitations, to abandon a struggle to overcome obstacles incident to human weaknesses, even death, sounded of failure to him. What followed is interesting. He dreamed a dream so great that to the average man it falls without the realms of possibility. He caught a great vision, the realization of which depends upon his discovery of the secret doors to faith and immortality. In accepting the challenge to make possible the fruition of that dream, the realization of that vision, he stepped outside the ranks of ordinary men.

Thus I read the document of record known as the Duke Indenture, having in mind that he spent ten of the ripest years of his life in the making. In it are to be found few limitations, and they are impersonal, fundamental, essential to the consummation of his life's undertaking. This document delivered without even the finger prints of a dead hand; vital, pulsating, expanding, appealing, will unceasingly demand and receive from those serving under its terms, devotion and self-sacrifice.

And thus Duke University was born. It is eminently fitting that the School of Medicine and the Hospital should have this first recognition, serving as the most practical human expression of Mr. Duke's interest in his fellow man.

Glorious in contemplation are the benefits, the expanding service, the refining influences, the uplift, the pains of new light and new life,



to be confidently expected from the operations of this school and hospital!

As the best and highest tribute to our benefactor and friend may I conclude with the old-fashioned and, therefore, eminently fitting, worshipful prayer—To our God, the God of his father, be all the glory.

#### GREETINGS FROM THE MEDICAL PROFESSION OF NORTH CAROLINA\*

By THURMAN DELNA KITCHIN, M.D.,  
President of Wake Forest College,  
Chapel Hill, N. C.

President Few, Ladies and Gentlemen:

As the representative of the medical profession of North Carolina, I have the honor and happiness to bring to you on this occasion an expression of its greeting, good will, and God-speed in this noble enterprise. Doctors are humanitarians, and as such, welcome an institution that has for its purpose the amelioration, cure and prevention of the ills that affect humanity. As North Carolinians, we are proud to have in our midst such a school of medicine, strategically located, scientifically constructed, and ably manned. We not only welcome its coming, but we also pledge in advance our professional sympathy and cooperation to the end that the dream of its benefactor may be fulfilled and the hopes of its executives realized.

North Carolina has great pride and joy in remembering that one of her own sons founded this institution. It is a new development, an expression of our own vitality and intelligence. While the whole State and all its agencies of enlightenment rejoice in this fresh flowering of our life, the devotees of our science of medicine may be allowed some distinction in the general happiness of this occasion. For what these agencies have already accomplished makes most opportune this important addition to our resources of training and service, and supplies a promising soil for the highest development of this great ministry.

In a remote corner of the State a friend has built a cabin which is all his own. It is senti-

nelled by long leaf pines and giant oaks, and when spring comes the dogwood and redbud make a garden spot of his retreat. For it is a retreat; there it is he goes when he is burdened by care, when, as an old negro servant expressed it, "his mind is overstocked." He can lie on the ground and feel the kind and understanding earth drawing his worries and grievances out of him. He goes there for inspiration also, for he can do his best planning and thinking there. And he comes away from his woodland haunt renewed in body and spirit, with a new vision of tomorrow's tasks.

You must forgive this seeming digression and the humble analogy of the cabin in the woods to Duke University's wonderful plant and broad acres. The truth is, I never come on this campus without being impressed by the wisdom and prophetic genius of those who selected this site for this great institution. They knew that this majestic wooded expanse would have its effect on those persons whose days would be spent here, whether the man at the fountain-head of knowledge, the student, the patient in the hospital, or the stranger who makes a reverent pilgrimage to these gates. The founders of Duke University knew that in a place like this nerves would be soothed and abilities quickened. On this campus, so recently borrowed from the unbroken forest, the mystery and magic of the woodland lingers and will linger. Here indeed the spirit can ask and receive.

It may seem trite to say that the age of miracles is not past, but these words will rise to my lips when I remember that a few years ago this place was a pine forest, and the beautiful stone which speaks so eloquently from these buildings was silent in a quarry. Yes, a miracle has been wrought—yesterday a forest, today a city set on a hill; yesterday a place of silence, unbroken save by the wind in the pines and the songs of the birds, today the Mecca of leaders in medical thought. Again I say we have seen a miracle.

We have waited for the coming of the Duke Medical School, but we have not waited in idleness. We find this day the culmination of a dream, the fitting and joyous climax of endeavor. We have sought to create an intellectual and scientific atmosphere in North Carolina in which such an institution as this may thrive, and it is our pride that we are ready to fall into step and march forward with this great new enterprise. If we all work together, is there any limit to what we can achieve? During past

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generations we have been, so to speak, cracking the great mother of the sciences, medicine, into smithereens (like petroleum in order to learn more about its component parts) making specialty after specialty. This was absolutely necessary in order to search out the inner secrets to the last remote hiding place. But we hope and believe that in this place, unfettered by tradition, unhampered by lack of resources, and with provision made in the most ideal way for intellectual and physical contacts, all under one roof, we may witness a reassembling of these now-understood parts into the original organism, medicine. In other words, we hope that analysis may be followed by synthesis. Have we not seen in the field of medicine the disjointing of the mythical jointed snake and is it not time now for us to view the spectacle of re-jointing?

There is another task before us, a task and a privilege. We hope that in this mild Southern climate the ice-bound quality, the rigidity, of the science of Medicine may thaw a little, so that the patient himself who is afflicted may be considered as well as his disease. In other words, that the patients admitted to this hospital will be regarded as personalities and not merely as cases. In this way the austerity of science could be blended with the sympathetic art of medicine, with no compromise of either. Surely the heart is just as necessary as the mind in the great business of healing. And if ever a neighborhood were suited in all its phases for this dual task, this seems to be the chosen one.

You will pardon me if I lay special stress here on the greetings from the two-year medical schools of the State. In speaking for these institutions (which give the pre-medical courses and only the first two years of the medical course) allow me to say that we in no way consider that we are in competition with you. The roads we travel lie side by side, with many pleasant and mutually helpful convergences. All these roads lead ultimately to the same great and important destination, the well-being of humanity. Your road goes further than ours and climbs higher, but we are ready to cheer you on to the last mile. With such cooperation we feel that nothing but mutual good can result. We think the two-year school is sound theoretically and will continue indefinitely for two reasons:

(1) The high standards required for medical students react on the academic work most favorably. The premedical students set a high

standard for other students because they have to do so. Moreover, the presence of medical students who are serious, hard workers, of maturer age, and who have frequently already obtained academic degrees, does much to stimulate academic undergraduates and give dignity and tone to campus life.

(2) It is commonly recognized that the drill work of the first two years of medicine can best be done where the group of students is small and the individuals brought into personal contact with the instructors. The fact that these instructors are selected for their capacity for this fundamental teaching makes for additional satisfactoriness to the extent that the great centers are relieved of this burden, they are the better able to occupy their most important field of clinical research.

Upon reading Lord Macauley's address upon his installation as Rector of Glasgow University in 1849, I am struck with the appropriateness to this occasion of one paragraph, which I shall read with necessary paraphrasing:

"There is no lack of alarmists, who will tell you that you are commencing under evil auspices. But from us, the medical profession of North Carolina, you must expect no such gloomy prognostications. We are too much used to them to be afraid of them. Ever since we began to make observations on the state of our country we have seen nothing but growth and we have been hearing of nothing but decay. The more we contemplate our noble institutions, the more convinced we are that they are sound at heart, that they have nothing of age but its dignity and that their strength is still the strength of youth. The hurricane that has recently overthrown so much that was great and that seemed durable, has only proved their solidity. (Might not this refer to our own financial depression!) They still stand, august and immovable. . . . I see no reason to doubt that, by the blessing of God on a wise and temperate policy, on a policy of which the principle is to preserve what is good by reforming in time what is evil, our civil institutions may be preserved unimpaired to a late posterity, and that under the shade of our civil institutions, our academical institutions may long continue to flourish. I trust, therefore, that when a hundred years have run out, this University will still continue to deserve well of our country and of mankind. I trust that after another century we may find the spirit of the institution the same, that the one who stands here in my place may boast that the hundred years have been glorious years, that he may be able to vindicate that boast by citing a long list of eminent men, great masters of experimental science, of ancient learning. He will, I hope, mention with high honor some of the young men who are now present; and he will, I also hope, be able to add that their talents and learning were not wasted on selfish or ignoble objects, but were employed to promote the physical and moral good of their species."

May I, in closing, remind you that there was in Jerusalem in the days of the Great Physician



a pool, Bethesda, meaning in the Hebrew "House of Mercy." It was a place of focalized pain, the five porches being crowded with the blind, the halt, and the withered. According to tradition, an angel came at certain intervals and "troubled the waters," impregnating them with curative power. This, of course, may only refer to intermittent springs whose waters were supposed to have medicinal value. I mention this traditional "Fountain of Miracles" because it may be said to have its modern counterpart in the Duke University Medical School. But this does not depend on magic or supernatural cures; it goes deeper than that. A God-given science furnishes the means, and science is indeed the wellspring by which the diseased body may be cleansed and made whole. From this School hundreds of angels of mercy will go forth to heal and prevent diseases that afflict the bodies and minds of men. These humane and philanthropic souls will help the Psalmist to fulfill his words:

"For with Thee is the fountain of life; and in thy light shall we see light."

#### THE TRANSFORMATION IN MEDICINE\*

By DAVID LINN EDSALL, M.D.,  
Dean of the Harvard Medical School,  
Boston, Mass.

Great industrial development so dominates the more civilized countries at present that the very age we live in is called "the industrial age." The changes in methods, in organization and in viewpoint that led to this have been so great that we speak of "the industrial revolution." It is, however, not only in industry that there has been a revolution. A similar transformation has occurred in many other lines of work and in none more than in medicine, which great field of work this University is now entering.

When fundamental changes in aims and methods are occurring in any form of human activity, there are, together with some disadvantages, certain great advantages for those who enter the field at a time when the direction and character of the changes have become somewhat advanced and in part defined. Those who have long been

in a movement have accumulated equipment, as well as traditions and viewpoint, and these have to be greatly altered, and alterations are often more difficult than starting afresh.

It is common knowledge that in great varieties of ways scientific progress has in recent decades had a profound influence upon the lives and the activities of civilized people. In no way has this been more marked than in relation to the preservation of health and the understanding and treatment of disease. Indeed, we may, I think, say with confidence that in no other way has the progress of knowledge had a greater influence upon the happiness, the well-being, and the effectiveness of the average individual. But we may also state with much confidence, and this is of immediate interest upon this special occasion, that no professional group has had the character of its work and the guiding spirit of its work so greatly transformed as have those who practise medicine and public health, and hence in no profession has the character of training changed so much.

The lay public, as well as the profession, comment frequently upon the many and great changes that have occurred recently in medicine, but I venture to state that few even of medical men, unless they examine the facts in detail, realize adequately how very great the change is, how many of the items of their daily work have been altered or quite transformed and, most important of all, how largely the mental attitude of the doctor has perforce changed.

It is customary to speak of the quantitative effects of the change, the numbers of details, that is, that have been altered. The more interesting and important effect, but an effect that is less obvious, is that, as additions to knowledge and methods have accumulated in number, there have come extraordinary qualitative changes in the purposes and the viewpoint that guide the teaching and the practice of medicine, and with this, the private or institutional care of the sick.

Some illustrations of this are very obvious. A generation ago there was fair knowledge of the effects of disease as found after death, but there was little accurate knowledge of the precise influence of diseased alterations of the body upon actual functions of the body during life, and there was similarly very little accurate knowledge of the precise causes of disease, and necessarily consequent upon this there was very little knowledge of the methods of real preven-

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tion of disease. Gradually new knowledge and new methods of study have taught us some of the effects of the structural changes upon the activity of the human machine while it is in operation and at the same time we have learned with precision the causes of some diseases and with this has come in some instances power to check existing disease and especially power to prevent disease. Each of these things is true in a far smaller proportion of the whole range of the doctor's duties than we wish might be the case, but the advance has gone far enough to bring with it a fundamental change in the conscious aims in view.

When I entered medicine, diagnostic skill really meant chiefly ability to designate accurately what would be found in the body if the patient died rather than what effect was actually being exerted by his disorder upon his life functions at the moment. As to prevention, we were so powerless in the vast majority of instances that hygiene meant for the most part quarantine of dangerously contagious disease, suitable plumbing installations, and the control of nuisances. The doctor's campaign at that time was largely a defensive one, and in hygiene it was in fact, though this was not realized then, in good part an anesthetic one. Now, while we are still far from being able to achieve our ends in most diseases, the trails have been in part blazed and many methods of further progress have been indicated. The intelligent physician thinks increasingly now of the functional effects of disease as the essential thing to be understood in diagnosis, while in hygiene the object has become the early arrest, or better, the entire prevention of disease, and in some cases the actual eradication of certain diseases. The aggressive view has largely displaced the defensive.

With all this, there has been a still more fundamental change in the mental atmosphere in which the doctor works. When I entered medicine, and for a considerable period after, the practice of medicine depended almost entirely upon the trained senses, especially sight, hearing, and touch, and the exercise of judgment, experience, and imagination in interpreting these results. In but few ways could the doctor obtain information that was accurately measurable, and in extremely few ways could he secure data that were absolutely definite. The impressions reached from a patient's story, or from tactile, auditory, or visual observations are ordinarily not precise, and used alone are often subject to

error. Only if death occurred and there was an autopsy could it be actually determined whether many of our observations were correct, though in a few cases this could be told at operation. Furthermore, these methods usually indicate only somewhat general things that are likely to be common to a variety of disorders, and judgment or impression must be depended upon to determine what they do mean in an individual case. The ways in which these older methods can be relied upon, as well as their limitations, have become much clearer since it has become possible to reinforce and criticize them by methods that are measurable.

Anyone who is vain of his powers of observation and their accuracy can easily have his vanity shaken by such simple things as, for example, comparing his estimates of the extent of anemia, made from merely looking at patients, with accurate blood examinations in a series of cases. And yet in even such simple things, the doctor had rather recently no methods of checking up upon the reliability of his interpretations of his own senses. We were, for example, taught earnestly as students to estimate the tension of the pulse by feeling it. I have often, in later times with a group of able and highly trained physicians, had the individuals of the group estimate the blood pressure by touch, and then check it with a blood pressure apparatus, and have at times found the individual estimates to range 100 points wide of the actual blood pressure.

When I graduated in medicine, my roommate and I were, I think, the only students among the six or seven hundred then in the whole of that school who had ever counted blood or examined stained specimens of blood. We had, but only because we had by chance close personal relations with a young instructor who had become interested in these new methods that were just coming in and he kindly taught us. There were no methods then of measurement of blood pressure in patients, the x-ray was unknown, bacteriological methods were, to be sure, beginning to be known, but they were little understood and hence little used, and when used they were often employed most ineffectively or erroneously. Surgical antisepsis had, of course, been in use for some time and with great advantage, but that it was in its infancy is indicated by the pictures that I can still see of one of our Professors of Surgery operating day after day in the same unwashable cloth operating jacket, always the same jacket, and while he told



us to use antiseptic methods, it was difficult to see in what efficient ways he used them himself, while the other Professor of Surgery, who was already an ardent advocate of antiseptics, would regularly scrub his hands thoroughly and after that would reach into his trousers' pocket for his pocket-knife, scrape beneath his finger nails, replace the knife, and proceed to operate.

The diagnostic use of bacteriological methods was already possible in a few ways, but was little comprehended or employed. For instance, with that great disease, tuberculosis, ever about and in many cases suspected to be the cause of obscure symptoms, my able chiefs never once asked for an examination for tubercle bacilli during the whole time that I was a hospital intern, though that was already feasible. The same was true of all that host of other bacteriological examinations of the secretions and of the blood that are now often an essential part of the clinical study of a case. The treatment that has come through bacteriological research and the preventive measures, the serums, vaccines, and so forth, that are now so eminently important in some diseases, almost all these were unknown. All but a few animal parasites, and these mostly of minor importance, likewise were unknown to the clinician, or were not yet thought to be of practical importance. Hookworm, for instance that vast and widespread disease, was then believed to be of very slight consequence, and to most doctors merely a curious thing found chiefly in some European mines. The usual doctor, even in this part of the world, where it is now known to have such importance, considered it outside his sphere entirely. Its great rival, as to geographical extent and the numbers of people whose health it endangers or ruins, malaria, could be accurately diagnosed as the parasite could be demonstrated in the blood. But that such things were not a common part of the practice of medicine is shown by an experience during my internship when we had a patient who was thought perhaps to have an obscure malaria. Nobody in that well-known hospital had ever seen the malarial parasite, so we asked a man in the city, who was supposed to have had some expert experience in this, to examine the blood. He told us, and showed us, that there were large numbers of malarial parasites in the blood. A year or two later, when I learned something about malarial parasites and recalled the picture in the above blood, it was perfectly obvious that what our

expert was showing us was the large numbers of stained nuclei of the normal white blood cells.

The Wassermann test for syphilis, now of such diagnostic and public health importance, was unknown, and I remember keenly the excitement, with dreadful numbers of cases of typhoid fever always around us, when the Widal test for typhoid came in and seemed likely to prove able to aid us greatly, as it has done, in the accurate diagnosis of the presence of that disease. We were wisely taught at that time that if we studied typhoid fever and its diverse complications thoroughly we would know most features of acute disease in general, but the prevention of that disease has since been so successful that if we depended upon it now to teach medicine doctors could not be trained in most of our communities. The diagnosis of what was then a greatly dreaded and terribly fatal disease for which there was no effective treatment, diphtheria, was still almost purely dependent upon observation and judgment. It was very common and the mortality sometimes ran to 50 and 60 per cent. It could not be controlled. At best some relief of symptoms could be offered. One of the most dramatic and affecting experiences that I have ever had was when I was working, a year after I had graduated, in Vienna and was daily going the rounds in the Children's Hospital, including the diphtheria wards. At that period diphtheria antitoxin came into use. We had seen in the same hospital wards a series of cases of diphtheria treated without antitoxin, and then the use of antitoxin began and we saw the marvelous difference. Old Professor Widerhofer, accustomed to the previous conditions all his life, day by day would stop amazed by the beds of children that a few hours before had been prostrate and dull and terribly ill, who were sitting up in bed, playing with toys and utterly transformed. His warm heart was always overwhelmed by the extraordinary change and he could only exclaim each day "Wunderbahr, meine Herren, Wunderbahr." The reduction since then in the deaths from diphtheria is one of the happiest stories in medicine.

The changes were often almost resented by some older conservative physicians. They tended to upset completely their long established conceptions. President Eliot told me very dramatically, with the astonishing memory he had of the details of conversations of even fifty years before, how bitterly a then very prominent children's doctor in the Faculty of Medicine in

Harvard opposed the establishment of the first laboratory of bacteriology and course in that subject under Dr. Harold Ernst, when the latter came back from Europe armed with some knowledge of this new subject. It was a new fancy notion that should not be encouraged in a serious course in medicine. But when the bacteriological diagnosis of diphtheria became possible, Dr. Ernst was the only man in that region who could make the diagnosis, and when the use of antitoxin came in he was the only man who could make and provide the antitoxin. President Eliot said that one day going into Dr. Ernst's laboratory he met the above mentioned pediatricist coming out of the laboratory and said to him, "Doctor, isn't this an extraordinary place for you to be?" Whereupon the doctor replied, "Yes, but nowadays you can't get your damned diagnosis anywhere else, and you can't get your damned treatment anywhere else."

It has always been the case, and probably always will be, that persons long accustomed to established methods in their life work will be greatly disturbed by very radical alterations of their methods and by very revolutionary alterations of their ideas. It is said, for instance, that when Harvey promulgated his discovery that the blood actually circulates, this revolutionary idea was so resented by his own profession that probably no one in medicine who had passed the age of forty ever forgave him. And yet it was, of course, as great a discovery, especially considering the circumstances of his time, 300 years ago, as has ever been made in medicine.

I might detail a multitude of other things, but I may epitomize by saying that the great array of exact methods which are now used constantly and which help the physician in many ways to check the accuracy of his observations in the general run of cases, which in some instances even permit him to make an absolute diagnosis and at times give him a definitely specific treatment, have almost all developed within the period that I have personally known medicine. I remember years ago attending a teaching clinic by Dr. Frederick Shattuck and hearing a student speak of some sign that he had obtained upon examining the patient, in his belief, a pathognomonic sign; a sign, that is, that definitely indicates a particular disease. Dr. Shattuck, in his characteristic wise and quizzical way which so often brought in a paraphrase of a Biblical quotation, replied, "A wicked and adulterous generation seeketh for a

sign, but no pathognomonic sign shall be given them." I thought then how true that was. And yet in the interval since then a whole group of signs that are essentially pathognomonic have been given us through new methods of study. Let us have no misunderstanding as to what these methods do, and do not do. One of the reasons for a critical attitude on the part of older clinicians has been their feeling that the newer methods are considered to displace the older established methods and to lead to their being discarded. In point of fact, it is difficult to keep many students and younger members of the profession from taking something of that view themselves. It is tempting when a method is exact to believe that it is necessarily superior to, and should supplant, inexact methods, and the long established methods of inquiry and of physical examination of patients are at times neglected, less because of the teachers than because of the enthusiasm of youth, I think. They are not intended to displace them. The valuable old methods remain and will remain. They are as basic and essential to the examination of patients as an alphabet is to a written language and their value has been in no way lessened, but has been increased and made clearer in that we know better in what ways they are to be depended upon and in what ways they are likely to lead us into error. But there have been added many that were previously unknown and are of great value, and a striking feature of many of these is their greater exactness and measurableness.

With no thought of belittling the value of these new methods in what they accomplish of themselves, I would say that the most fundamental effect has been the altered atmosphere and viewpoint in clinical medicine that they have brought about. The doctor does things much more skillfully and with much more certainty than before, but this is not solely, indeed not chiefly, because he has a larger variety of tools to work with and because the accuracy of his tools has improved. It is chiefly, I think, because only a few years ago so little could be done in precise ways, so much depended upon the personal equation, that he was thrown back constantly upon speculation, and speculation tended to become habitual. When a consultant was called in, it was his opinion that was wanted. He rarely had any greatly differing methods of studying the patient, or much greater skill in them than a good practitioner. He had, or was believed to have, wiser judgment, more



information and experience, more intuition. Now enough things have become subject to more exact methods, and the beneficent effects of precision have become obvious enough to teach the doctor a distrust of mere opinion and especially of speculation, and his aim has become accuracy and demonstrability and the critical examination of his own and others' methods and interpretations. My friend, Professor Whitehead, said to me recently while driving in the country, that he believed the motor car had had an extraordinarily valuable educational effect upon the uneducated farmer in entirely altering his mental attitude and judgments, and explained this by saying that the farmer had always had two dominating things in his life that he could not control or work out in any accurate way: one, climatic changes which are beyond his powers of control; the other, disorders in animals. The latter, even more than human diseases, are very difficult to understand, even by trained persons, and they have throughout long tradition been conceived of and handled by most farmers largely on the basis of legend and superstition, with no method of determining that their ideas regarding them were right or were wrong. There was, for example, for years a widespread feeling among many farmers that a variety of disorders in cows are due to what they called "hollow horn" and the treatment used to be to bore a hole with a gimlet or other tool into the cow's horn, apparently to let the hollow out. The tenant farmer on a farm that has for a couple of hundred years been owned by my family, a fairly intelligent man and an excellent farmer, became convinced some years ago that a sick cow had "hollow horn," but dehorning of cattle had come in and this cow's horns had been removed. Having no horn to bore into, but the cow appearing to have "hollow horn," he proceeded to bore a hole into her skull with a gimlet. Whether the hollow escaped or not, the cow died of meningitis. The motor car has, said Whitehead, brought into the farmer's life a thing that has become essential to him and which, if out of order, he can with very little training investigate fairly accurately and often clearly demonstrate what is wrong and what should be done about it. This has quite altered his whole viewpoint regarding many things, from the speculative, superstitious one to a realistic, logical and objective one.

A change comparable at least to what has just been mentioned, though on a higher level, has

occurred in the past few decades in medicine, and that change is, to medicine itself, the most influential and striking thing perhaps that has occurred. Is the viewpoint in the following incident, much more logical, even though it be more academic and apparently more rationalistic, than the superstitions of the farmer? A great German physician, Kussmaul, in his reminiscences which he calls "Jugenderrinerungen eines alten Aerztes," refers to the notebooks of his father, a doctor who was trained under Schoenlein, at the time the most distinguished clinician in Germany, a man of scientific training and, for the day, of scientific viewpoint, whose work is permanently recorded in medicine. The elder Kussmaul's notes on a lecture by Schoenlein are about as follows:

"Gentlemen, iron is the drug par excellence for diseases of the spleen, and if you will reflect a moment you will see why this must be so. It has long been known that mercury is the drug of choice in diseases of the liver. The liver is a large, firm organ on the right-hand side of the body; the spleen is a small, soft organ on the left-hand side of the body. Mercury is a light-colored, brilliant fluid metal; iron is a dark-colored, dull, solid metal. Obviously iron, then, is the drug of choice in diseases of the spleen."

That, to be sure, was one hundred years ago, but there were details that were comparable to this in the teaching that I had as a medical student, and the striking thing was that the mere opinion or reasoning of a distinguished person was often followed almost religiously by a large proportion of the profession. In treatment particularly, I could detail many things that were then considered either specific in certain diseases or at least the absolutely necessary treatment that have now been wholly discarded and in some instances have been shown to have been diametrically the wrong treatment. The spirit that was shown in a letter that I have seen, written by Benjamin Rush, the great man of his day more than one hundred years ago, to a physician with whom he had seen a patient in consultation and for whom he had obviously recommended bleeding, is not different in spirit from another incident that I shall mention immediately that occurred one hundred years later. The doctor had written Rush that the patient had died after the bleeding and that he thought bleeding had precipitated death. To this, Rush replied angrily that the whole trouble was that the doctor had not bled the patient enough. A few years ago a doctor friend of pediatrics in a prominent medical school saw an infant who was doing badly. This consultant

prescribed a certain milk mixture. The baby did not improve and the family doctor wrote asking him for further suggestions. The consultant replied, "Continue to use the milk mixture I ordered and the child must improve."

The great difference now is that a considerable number of things have become subject to accurate demonstration and criticism and that mere opinion has become of little moment unless re-enforced by accurate and logical data.

Those who have been but a few years in medicine, and especially those who are now entering medicine, have, of course, no way of realizing how different it is from a generation ago, except that they are told. They naturally accept medicine now for what it is now. Great changes will occur in the decades immediately to come, almost beyond doubt. They may readily be even greater than those that have occurred in the past generation. But however fascinating the progress of medicine may be in the years to come, it can, I think, never give quite the same sort of thrill that those of us who have seen the past few decades have had, for not only has there been the thrill of seeing enormously interesting and vastly beneficent things discovered and put into practice one after another, but there has been that change from the time when the physician working as earnestly and as conscientiously as possible worked nevertheless with a consciousness that in a painfully large portion of his tasks he trod in the dark without clear knowledge of how to go forward, especially in practical ways of controlling disease, and in treating it by specifically effective means. The light is dim still in very many ways, but some things and some pathways can now be clearly seen and the doctor knows now that blindness is not imposed upon him from generation to generation, but has confidence that things will be more and more visible from year to year. That change, I think, can occur but once. We have seen essentially the birth of a new medicine and things are born but once.

We owe this in nearly all ways to the devotion and brilliancy of a great group of workers in the laboratory and in the field in all parts of the world. The constant pressure upon, and the limitations of the life of the practitioner, while they allow him to perfect detail, make it impossible for him usually to contribute much himself that is fundamental. The bacteriologist, the pathologist, the physiologist, the biochemist, the hygienist, the clinical investigator,

whose lives are devoted to that sort of work, contribute nearly all the deep, fundamental ideas and methods which are applied to the practice of medicine. Oftentimes their practical value seems distant, if there be any, and often it takes a painfully long time for them to reach practical utility. It is frequently said that a great scientific discovery is not made of general practical value on the average for perhaps a generation. But it is surprising to realize how rapidly many purely scientific discoveries have become of the utmost practical value within the past few years. It was almost no time after the photographic powers of the x-ray were discovered before it was demonstrating in the clinic things that could never be determined before. A pretty example of the rapidity with which a purely abstract study can lead to highly practical things is Dr. Cannon's work on the x-ray in relation to the digestive tract. It began with the desire to settle, for almost purely academic reasons, the question whether, in swallowing, the food is bolted from the throat down to the stomach with one thrust or whether the muscles of the gullet carry it by continuous wave-like contraction down to the stomach. Cannon chose geese because their long necks would permit of better observation and he had them swallow buttons that would be shown by the x-ray. He soon settled his original point, but wished to make more accurate observations and used a substance that would pass more slowly and would adhere somewhat as it passed along, so as to give a better picture, choosing bismuth. The original interest was supplanted with great rapidity when he found promptly that he could see the shape, the motions and other features of the digestive organs in ways that had never been possible before. Very rapidly the obvious practical interest of this physiological study caused it to be transferred into the clinic, where it has become, of course, one of the most important aids in telling whether the digestive organs are organically normal or have one of a variety of important disorders, a point that often could not be determined at all before with any accuracy.

It is but natural that with this enormous change in the whole conception of medicine and with the great accumulation of new and more scientific types of knowledge necessary now in order to understand the practice of medicine that many persons, particularly older clinicians, should feel that the scientific aspect of medicine is exaggerated in the training of doctors. For years, the same comment has been made many



times by men distinguished in the profession. The gracious author of "Rab and His Friends" dwelt strongly upon this in one of his essays. Oliver Wendell Holmes, of course, emphasized the same fear and so have many others, and yet medicine has gone on since their time, becoming more scientific and requiring scientific training much beyond what they felt was already too much. It is quite possible to let the scientific training crowd out other essential aspects and I would not seem to belittle the empirical upon which we still must often lean, while the psychological aspects which we cannot yet study by precise methods must be emphasized more than has ever yet been done, even though they still depend chiefly upon observation and imagination and other inexact methods of study. But it is quite clear that a fundamental understanding of the elements of the basic and the medical sciences upon which much of medicine now absolutely depends is necessary to intelligent entrance into the practice of medicine, and also that the training in science should be such that the doctor of the present day, facing a probable advance in knowledge as great as, if not greater than, that which has occurred in the past few decades, must have training enough not only to comprehend what is now known, but also to judge somewhat critically the work that will appear in coming years in order that he may intelligently use or discard new observations, or he will rapidly become a fossilized product of what is now the best but may soon seem an old-fashioned type of medicine. The changes that have occurred have been vast, as indicated. Those that are to come are likely to be even greater and even more rapid for a time because such wide fields have been opened and such a multiplicity of attack has been devised. A generation or so ago the making of a great discovery indicated genius, and genius is rare. The methods now have been so greatly improved and multiplied that similarly important discoveries occur constantly, but they now seem to us due less to genius than to thorough training and use of what is known, and to devoted work. These are not rare. With many persons prepared to add to knowledge and with many methods available now, the speed of progress is likely to be much increased.

Among the changes that are beginning now and that are likely to occur still more largely in early years to come, there is one aspect of medicine that, while it is less thrilling than great discoveries that make profound alterations in the

control of disease, is nevertheless likely to be extremely influential and to have an effect upon the character of the practice of medicine, and the character perhaps of the average doctor, as great as some of those things that I have mentioned.

The medical profession is almost unique in one highly important particular. In other professions, as in law, engineering, the ministry, and other forms of work, the individual members of the profession work more or less openly in public or in well developed organizations where they are subject in the details of their work to the knowledge of others, and the character of their work can be judged favorably or unfavorably upon evident grounds. They are likewise parts of more or less defined organizations—the church, the bar, construction companies, and the like.

The medical man, on the contrary, does his work from the time that he begins his professional practice in most cases alone and without critical knowledge on anyone's part of the details of it. Dealing with the most important things possible, with life and health and death, he is absolutely his own master and has only his conscience to guide him or check him. I have the strong impression that perhaps as a consequence of this the medical profession is more ill at ease in organized methods of work and under any general control than other professions. Perhaps it is because it has attracted an independent type of person, perhaps the experience itself makes them prefer and demand the independent method of work. Certainly it was, a generation ago, a very unusual thing for one in the medical profession to be willing to enter into any organized method of doing his work. When I graduated, few men went into the Army or Navy or Public Health Service, and when they did it was often somewhat reluctantly and chiefly because it provided a solid and dependable berth. Very few ever went into other forms of salaried positions, and then mainly because simply of the need of money and usually with the desire to get out of it as soon as possible. It was looked upon as almost unethical to accept any form of position that was what was called "contract practice." Slowly a considerable change has already occurred in this. The public services are, of course, highly respected now. Practice on salary in industries, once a thing that branded a man unfavorably and at times would rule him out of medical societies, has now become an important line of work and has a special portion of the American Medical

Association meetings devoted to it. And so it has progressed in various other ways and, in all, to the point where a noteworthy number of doctors are now working in defined salaried positions in organizations. In a great many countries a definite form of widespread health insurance, that involves more or less defined contract relations with a major proportion of the doctors in those countries, has developed, a system that is compulsory in 23 countries for all those people below a certain income and is gradually being extended in many of them to somewhat higher incomes. This has brought much opposition in a number of countries, continued opposition in some, but in some has been so far adjusted to the welfare of both the people and the profession that it is becoming highly acceptable to the profession. In some countries, notably in one, it has been administered with such strong organization and such purely business viewpoint that it is really to some degree threatening the quality and character of the men that will enter medicine, both because of the conditions under which they work and because of the fact that the insurance people will not take very young men, and there is a period after graduation until they reach acceptable age for the insurance work when the young medical graduates are almost without means of earning their livelihood. Furthermore, it threatens to have a serious effect upon progress because in the scientific centers the necessity for carrying out expert detailed work of consultative character has become so multiplied and pressing and requires so much paper work that the able young men doing investigative work in the clinics are becoming overwhelmed with the pure routine in relation to the insurance.

The above example is sufficient evidence of the need of caution and foresight in this matter. The subject has given rise to much discussion. What will come in this country to meet the situation is not predictable. It is certainly likely to differ from the conditions in foreign countries, but that some degree of organization will grow out of this is altogether probable, for back of it is a purpose that is both highly intelligent and highly humane, namely, to provide for all persons adequate medical care at a price that is not a serious hardship and to accomplish this, in part at least, by distributing costs rather than by having all the heavy costs fall at any time upon those unfortunate enough to have the illnesses during that period. It would be foolish to attempt to prophesy what will come in this

country, but it is obvious that the future will be met more intelligently if met with the cooperation of the medical profession and the outcome is made as effective and as agreeable as possible to the working physician, rather than simply opposed and antagonized. Certainly it should be approached with the purpose of preventing any system that tends to destroy some of the most valued aspects of medicine, particularly the freedom of action of the doctor, his freedom of growth and development, and the freedom of choice between patient and doctor. It is altogether probable that the situation will be met at first in this country in a diversity of ways in the different areas of the country. Among the many disadvantages of multiple ways of doing things due to our states' rights system there is the great advantage of opportunity for localized experiments as against covering the whole country with a relatively untried new system. In America we have sometimes taken advantage of this opportunity to work out quite intelligently certain public problems by experimenting in different ways in different states and gradually developing uniformly a well tried scheme. That, I trust, is likely to be done in this case and it may well be done. One way in which the distribution of facilities and the distribution of costs of care has been increasingly carried out in this country with increasing effectiveness is a way in which the founder of this University was, of course, deeply interested. There is in this institution, in the association between this School and the great endowment for hospitalization in this State and its neighbor State, an extraordinary opportunity for the development of a fine experimental example of the medical care of the whole community that may well greatly influence the care of the sick and the training of a new generation of physicians throughout the country.

It cannot at any rate be doubted that great changes in the economic relations of medicine are at present in progress and that still greater changes will come. Finance and industry control our modern life and will for a long time to come without doubt, and finance and industry appear to have found out quite clearly that health is an important thing to them. Great numbers of people realized this only with the building of the Panama Canal and with the dramatic evidence that that gave as to what modern control of health can do in great undertakings that are powerful in both war and peace. There have been many other examples of it in



recent years. It is interesting to reflect that so far as I am aware the first great step in preventive medicine that was taken in relation to a definite disease, a step taken a hundred and fifty years ago and that even considerably preceded vaccination for smallpox, gave rise at once in the minds of a group of highly intelligent men to a recognition of its economic importance. I think that ability to control scurvy was the first large step in the specific control of disease, in that case, of course, a nutritional control. This was due to a Naval surgeon, James Lind, who saw and thought far more clearly than most men of his time. He showed the enormously beneficial effects of certain things, particularly of fruit juices and fresh vegetables, in the diet of the sailors under his care at the hospital at Haslar when they had scurvy, then a very common and terribly severe disease of which many died. Captain James Cook was intelligent enough to suspect the importance of this and when he made his celebrated trip around the world he put into practice the methods that Lind had used, with the result that in his three years' voyage he lost only one man from obviously preventable disease (including not only scurvy, but other diseases, the methods that Lind used being broader than the mere dietetic control of scurvy, and involving other factors that tend toward disease). Soon after Cook, Lord Anson, the Admiral of the British fleet, likewise went round the world, but scorned to pay attention to these methods. On his flagship, "The Centurion," out of a crew of just under six hundred men, he lost almost three hundred in only a nine months' voyage from preventable diseases. Had Cook had the same proportion of losses, he would by the end of his three years' journey have had only ghosts as a crew. I think comparatively few people realize that upon Captain Cook's return, when he was given membership in the Royal Society and the gold medal of the Society, it was done particularly with a clear recognition by the able men in that body of the profound importance of his observations regarding ship's hygiene upon the future of England's maritime commerce. But that observation stands alone for a long, long period, particularly in the clear recognition of the economic value of health. In recent years, however, the evidence of its value has so multiplied and the public recognition of it has been so great that one sees a variety of ways in which this is deeply penetrating the minds of those who control the great activities of the world. When, as has happened, some railroads have instituted in the communi-

ties along their lines in certain areas of our Southwest measures for the control of malaria because they recognized that the betterment of health bettered the activities of the region and thereby bettered the business of their railroads, we may well take it that a new consciousness of the economic value of health is arising.

That great disease, malaria, presents other examples of the intimate relation between precise science and economic interests. The entomologists have demonstrated the peculiar fondness for impounded waters of the special variety of mosquito that in this country carries malaria, and this has led to legal regulations concerning the impounding of water that are directed toward the prevention of malaria. The expense of these, and the desire to reduce costs, led on to very interesting developments in mosquito control. This matter is of immediate concern in this general region and if I mistake not gives this University itself a direct interest in both the humane and the economic aspects of it.

Economic relations come up frequently now in seeking the control of certain diseases and even their prevention and in ways that would have been unthought of but a few years ago. In the great Mississippi flood of 1927, widespread and effectual measures were instituted for the control of an expected epidemic of infectious disease with profoundly striking results, infectious disease actually decreasing instead of increasing. The unexpected and surprising difficulty that was met was an outbreak of pellagra, a nutritional disease, not an infectious one. Investigation made it appear probable that this was due to economic conditions that would scarcely have been thought of only a few years ago in searching for the cause. The cotton crop had been poor for some years and most of the people in that region were dependent upon the cotton crop and consequently a large proportion of the inhabitants of that area, in order to get cash, had sold off things that could be turned into cash, largely chickens, eggs, milk, and the like, things in other words that are, against pellagra, the important normal protective parts of the diet. The people had thus become apparently sub-pellagrous and when the disaster precipitated upon them such conditions that only an artificial diet that tended toward pellagra could be provided them, pellagra broke forth in epidemic form.

When it became evident years ago that throughout vast areas of the South pellagra was very common, it was often said that it must all

have been there before and been overlooked. To any one who has investigated the conditions in the areas where pellagra has been common, this seems a poor explanation, unless the medical profession is much less intelligent in recognizing disease than we hope. It seems more probable that one important factor at least was the condition that New England is now suffering from, namely, that cotton mills have been moved from New England to the South and right in the cotton fields not only were there mills constructed, but new villages and towns, and the poorer people of the neighborhood who had previously lived on the land, and while they had lived poorly had had normal forms of food, had been collected into villages where their diet had to be obtained largely from things that were imported in bulk and provided by the company store.

Again, many further illustrations of this point could be brought forward. The disease beri beri, so important in wide areas of the world, is, of course, dependent upon peculiarities of diet, and these in large part depend upon economic conditions. When I was in Peking, I found beri beri not uncommon, but the hospital staff had shown that it occurred there chiefly in poor students from other portions of China who were accustomed to very different elements in their diet, and, being unable to pay for things unusual in Peking, and not liking the food that they were not accustomed to, eliminated much of the latter from their diet and thereby unconsciously put themselves on a diet tending to produce beri beri.

In a great area of China, that extraordinary disease, osteomalacia, is astonishingly common. Here again it is with little doubt due to peculiarities of diet imposed upon the people in that area in part by great poverty and not improbably in part by defects in the soil, such as Arnold Theiler demonstrated to be the cause of certain bone disorders in cattle and horses in South Africa.

The invasion of big business into Porto Rico has been coincident with nutritional defects in large numbers of the people of that island, which while not yet clearly studied, appear to be probably due to two things: the extension of the growth of sugar cane until it has swamped the gardens that the people once had, and on the other hand accustoming the people to manufactured foods that can be bought in bulk and provided cheaply.

I would not multiply to the point of wearying you illustrations of the increasing recognition of the economic relations of health, but I would cite one more type of instance. Many of the great and successful industries of the country now recognize that in the control of specific health hazards and in the maintenance of more general health conditions of the industry, it pays to have a trained force and a costly system to care for their employees. They are coming also to recognize somewhat more subtle things. The head of a great corporation in this country has told me that they could have saved hundreds of thousands of dollars in what had subsequently been demonstrated to be necessary if, at the time that one of their large plants was built, it had been constructed under the supervision of an engineer who knew the elements of hygiene. It has become manifest that road engineers may either cause or prevent malaria in accordance with their methods of construction. Similarly I have seen instances where the effectiveness of an industry was greatly hampered and much unrest and disturbance occurred amongst the employees because the engineer who designed essential machinery set the pace of the machinery, as is usually done, from the standpoint of production and without due consideration of the physiological powers of the human individuals who attended the machines. Such things have apparently entered the consciousness of a few employers sufficiently to make it seem wise actually to develop some engineers with a special training in hygiene, an entirely new sort of profession. And at the desire of our Engineering School, our School of Public Health is conducting training for engineers throughout about a year's time that leads to a master's degree in engineering.

The picture is now such that it is difficult to escape the conviction that this economic aspect of medicine will influence more and more intimately for a considerable period to come many of the relations of the physician, and that careful, systematic study of the relation between medicine and economics, instead of the casual observation of its importance that has mostly been the case up to the present, is highly desirable for the future of medicine itself and may lead to certain additions to, or alterations in, the training of the physician, at least of certain considerable groups of them. We have long since recognized that the progress of medicine demands not simply men with medical training, but the aid likewise of the biologist, the chem-



ist, the physicist, and, also in more recent times, combinations of these like the bio-physicist, and experts in special aspects of these subjects, such as the physical chemist, the entomologist, the parasitologist. It begins to be highly probable that we shall now need very intimate association with, and aid from, the economist and that, as soon as forceful methods of studying our interests in that field are developed, we shall need the aid of expert sociologists. Certainly while it may be religiously hoped that the personal relations between the doctor and the patient will not be greatly altered in the care of sick individuals, it is evident that whereas until comparatively recent years the practising physician led an almost cloistered life doing his work in the quiet and seclusion of the sick room rather than in public, he now clearly has pressing public relations that bring a large part of his life into important public contacts, and whether he wishes it or not he will of necessity in future have closer relations with organized activities. This University, starting with the training of physicians closely associated from the beginning with a great and beneficent system of providing modern medical care for all the neighboring communities, is in an admirable position to contribute powerfully to thoughtful and intelligent progress in the services that medicine will render in future.

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#### HOSPITALIZATION\*

By WATSON S. RANKIN, M.D.,

Director of Hospital and Orphan Sections of  
The Duke Endowment,  
Charlotte, N. C.

President Few, Distinguished Guests and  
Friends:

Because one man lived and thought and planned, we are gathered here in this castle of his dreams where ever resides his brooding spirit. Let us go back and endeavor to share his thoughts, see as he saw, and draw our inspiration from his great purpose: A country boy following the furrow, a youth peddling tobacco from a covered wagon, a lonely young man submerged among the millions of the metropolis, a

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\*Address delivered at the Dedicatory Exercises of Duke University School of Medicine and Duke Hospital, Durham, North Carolina, April 20, 1931, publication in the Southern Medical Journal financed by a grant of funds from Duke University School of Medicine.

captain of industry emerging from the mass, a strong man standing firmly amid the treacherous cross currents of commerce, a giant wrestling with the river, and then, full stature, maturity, autumn, with its mellowing reflections, his father and his father's ideals and that lengthening of the days vouchsafed to him who honors father and mother, lengthening days through the integration of his life with that of aged ministers, with that of childhood bereft of parents, with that of hundreds of thousands of helpless sick, with that of this great University, destined to play an important role in the history of our State and country.

It is written that everything is beautiful in its place, that is, when seen in all of its relationships. There is fascinating harmony in seeing the picture not in part but in the blended beauty of the whole. Where others have seen fractionally and provided some part of healing machinery, a clinic, or an important department of a large hospital, or even a large hospital, or a medical school, James Buchanan Duke, in the largeness of his vision and out of the abundance of his heart, saw and provided for a whole system of healing, complete in the articulation of its several parts. Thus seeing, he saw the hospital not as a thing in itself and by itself, but in its proper relation to the whole broad problem of modern medical care for both the many within its walls and for the multitude within the shadow of its healing influence; and seeing yet further, he saw the hospital not only in its relation to the whole community, but in its relation to other hospitals, saw the many hospitals which he would help to build and maintain, not as separate entities, but as a system of related, kindred, mutually helpful institutions.

Permit me now to speak briefly of these two relations of the hospital: first, the relation of the hospital to the community, and next, the relation of the hospital to other hospitals.

#### THE RELATION OF THE HOSPITAL TO THE COMMUNITY

A hospital is related to a community in three important respects: (1) It increases the quantity of medical service; (2) it improves the quality of medical service; (3) it provides for the poor.

A hospital increases the quantity of medical service available to a community in three ways: (1) It serves to retain in the community the older, more ambitious physician who has kept abreast of the advances of his profession and

who, without the facilities of a local hospital, is under constant temptation to remove to a community where hospital facilities are available; (2) it holds out to the more recent graduates of medicine, 90 per cent of whom have had one or more years in hospital practice and who have come to feel more or less dependent upon hospital facilities, strong inducements to locate in the community; (3) it still further increases the quantity of medical service available to a community by greatly enlarging the professional capacities of the physicians engaged in local practice. A physician whose services are in great demand, especially for the treatment of the more seriously ill, can examine and treat in a hospital, where he is assisted by nurses and technicians, many patients in the same time which would be required for him to reach and examine, unassisted, one patient on the outside. At Banner Elk, North Carolina, in a mountain section, sparsely settled, where travel is comparatively difficult, especially in the snows of winter, there is a 25-bed hospital, with two physicians, eleven nurses and one technician. These two physicians, with the hospital facilities and the assistance of its nurses and technician, are able to do, and to do far better, what would require the services of from six to eight physicians without hospital facilities and professional assistance. Last year this little hospital treated approximately 1,000 patients and provided treatment in its out-patient service for more than 6,000 visits.

A local community hospital, then, adds to the quantity of medical service available to a community (1) in retaining the better type of older physicians in the community, (2) in attracting the more recent graduates of medicine to the community, and (3) in doubling, trebling or multiplying by an even larger factor the professional capacity of the physicians practising in the community.

A hospital improves the quality of medical service available to a community in the following ways:

First, it holds and attracts the more ambitious and progressive type of physician to the community. It influences, as I have already pointed out, the distribution of physicians quantitatively, but what is far more important, it influences

their distribution qualitatively. It is the better type of physician who is retained in and attracted to the community by a local hospital.

Secondly, it supplies to all the physicians practising in the community those facilities for taking care of local emergencies, surgical and obstetrical conditions, and provides them further with those diagnostic services, the laboratory and x-ray, without which it is impossible to practise modern medicine.

Thirdly, in the organization of its staff, the hospital supplies for a whole county a court of professional appeal for all cases of questionable diagnosis and treatment, and the very existence of such a professional court and the constant possibility of appeal has a far-reaching inhibition on carelessness in the general practice of medicine.

Fourthly, through an organized staff, the work of the individual physicians, especially their fatalities and infections, becomes a matter of professional responsibility, supervision and review. Time will not permit me to develop this thought. I will only ask you to reflect for a moment upon the difference in the relation between patient and physician when the patient is seen in the private office or home, and the relation between patient and physician when the patient is seen in a hospital, organized as it should be with the medical attendant a member of a professional staff and with his work under its constant supervision. In the one case, anything might happen and there is no review; in the other case, if anything serious does happen, there is assumed professional responsibility and review. In one case, the physician works alone, unchecked; in the other case, he works under the eye of his profession, open alike to its commendation or criticism.

A community hospital provides for the poor. Approximately 30 per cent of the patients in hospitals of the United States are full charity cases; 20 per cent are part charity cases, and 50 per cent are full pay cases. Forty per cent of the days of care rendered by the hospitals of the United States are free days. "The poor ye have always with you," and, judging from the amount of charity carried by the hospitals of the various sections of the country, the poor ye have everywhere with you.



The poor, scattered over our rural country, cannot expect the better type of physician, men who are busy and whose time is limited, to make long drives over rural roads to give them free service. They must be served, if served at all, in a limited way and by physicians who have time for rural practice, for long drives, physicians who are least in demand. All this the hospital mends. The poor are assembled under most favorable conditions for their restoration to health and adequate medical service from the best of the physicians of the community is made available to them.

In this conception of the relation of the hospital to the community, we see the hospital not as an entity but as an essential part of a complete medical service, a complete medical service which may be conceived of as a tripod, the three legs of which are (1) hospital facilities, (2) professional assistance, nurses and technicians, and (3) medical personnel or doctors. The hospital supplies in itself two legs of this tripod, facilities and nurses, and serves as the means for obtaining the other. In this way the hospital affords not only a place where the seriously ill are assembled and treated, but it becomes the means for building up a complete medical service that reaches to the remotest corners of the county.

#### THE RELATION OF HOSPITALS TO ONE ANOTHER

The more obvious physical relations between hospitals, such as the number of hospitals and hospital beds for a given population group, and the proper distances between hospitals, will be passed over with this brief reference.

There are less obvious but more important functional relations which should be noted here with greater emphasis and which in the future should begin to receive careful attention and every encouragement. It is not difficult to conceive of many avenues that lie open to this great central hospital for making itself most useful to other hospitals, nor is it difficult to imagine the opportunities for service within easy reach of our larger hospitals, which we may conceive of as district hospitals, such as the Highsmith Hospital at Fayetteville, the McLeod Infirmary at Florence, the James Walker Memorial Hospital at Wilmington, and others, to the smaller neighboring county hospitals, more elemental in their equipment and in the specialization of their professional staffs. More-

over, it is inconceivable to think that service rendered by the larger to the smaller hospitals will not be reciprocated in referred work. Kindness does not move in a straight line, but in an orbit, and sooner or later returns to its starting point.

With that breadth of vision of him who made our work possible and who saw the hospitals of the Carolinas not as scattered, separate units, but related in a great system of healing, we look forward to the time when the participating hospitals of The Duke Endowment will be articulated in a service of mutual helpfulness.

#### A REPORT OF PROGRESS

Much remains to be done to bring us to a full realization of his great conception; nevertheless, a good start has been made.

In 1925, 52 hospitals of the Carolinas participated in the work of The Duke Endowment; in 1930, 103 hospitals participated in the work of The Duke Endowment. In 1925, The Duke Endowment contributed to hospitals that included 41 per cent of the hospital bed capacity of the Carolinas; in 1930, the hospitals assisted represented 62 per cent of the hospital bed capacity of the Carolinas.

Hospital provisions for charity have increased in free bed day work from 216,781 days in 1925 to 339,127 days in 1926, to 434,361 days in 1927, to 518,999 days in 1928, to 612,318 days in 1929, to 718,667 days in 1930.

The growing interest and larger participation of the people of the Carolinas in providing hospital care for those who need it and cannot themselves obtain it is evidenced in the fact that the 43 hospitals which have participated in the work of the Hospital Section continuously for the last six years increased their charity days from 208,550 in 1925 to 462,000 days in 1930, an increase of 122 per cent.

In these figures we see the force and the effect of the example of our great leader, who, like Moses, standing on the heights and looking toward the Promised Land which he was not privileged to enter in the flesh, saw beyond the reaches of the retina, in the images of his thought, a better and a more beautiful world for those who should follow him. Toward that larger and brighter future, O absent one, we move on in your own simple faith, hoping, believing that from on high your eyes behold and your spirit guides.

## EXPERIMENTATION IN MEDICAL EDUCATION\*

By LEWIS H. WEED, M.D.,  
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An occasion such as this, when we are gathered officially and formally to dedicate an important philanthropic and educational enterprise, seems to be more than merely an opportunity to felicitate the mother university and the community upon a definite achievement. This gathering marks more than the completion of a great building program; it records the launching of a new undertaking, providing new opportunities and new facilities for educational advance. The primary object of such a grouping of medical institutions as now have been completed by Duke University is of course educational, when viewed from the narrow standpoint of Duke University as an institution of higher learning; but with its hospital under the control of its medical faculty, Duke University offers in this new series of buildings a great humanitarian service to the community. Such intimate association of a medical school with a university hospital has repeatedly demonstrated its effectiveness in providing the best possible care of patients: the clinical teachers of all medical schools realize that their first obligation is the welfare of the patient in hospital bed or in dispensary. Yet fused with this duty of clinical care is the problem of education in medicine. To this topic I shall devote myself.

It is trite to talk of education as a general process of civilization, for it is recognized that educational practices begin even before the child is admitted to school; and they should, if conditions are quite favorable, extend throughout adult life in one form or another. As one analyzes present day educational tendencies, one finds that throughout the various groups of institutions there exists at least one phenomenon in common. One encounters in primary and secondary schools trial methods, where the child is allowed to work under various systems of instruction, upon subjects which arouse his interest. In some of the more advanced or radical

schools, formal instruction is largely done away with; in other more conservative schools, instruction proceeds along definite and controlled lines of formal pedagogy. In the public schools of this grade, where universal education is considered a community obligation, it is not surprising that teaching methods should become largely standardized.

In the higher schools, the colleges, divergence of educational methods may also be noted. Here in recent years, certain institutions have devoted themselves to instruction of college students on a tutorial basis; in other places, so-called "honors courses" have been arranged for students of the last two years. Elsewhere, by establishing house units, attempts are being made to create wider intellectual interests by closer contact with students of other classes and with instructors living within these units. In still other institutions the instructional procedures are much more conservative and are almost standardized in content of courses and mode of teaching. Yet with the almost universal development of an elective system, whether it be liberal or rigid, the student is allowed some individual choice in his four-year college curriculum.

In the graduate schools of universities, there exists a certain lack of uniformity in academic conduct though the general methods are identical. In the majority of American graduate schools, by the system of majors and minors, there is an insistence on every candidate's meeting definite requirements for a degree. It is the exception, rather than the rule, to find true liberality of graduate instruction. Universities are, however, constantly altering in minor ways the methods of graduate teaching and are constantly trying to improve the quality of the product. The problem here is one of departmental instruction rather than one of broad general training; the student, theoretically at least, comes intimately into contact with the frontiers of knowledge. The true graduate school, in distinction to the vocational training schools, should afford real academic discipline in research, and any trial method of teaching should be aimed at the development of the individual rather than of large groups.

In all of these various phases of present day education, dissatisfaction with current teaching procedures seems a phenomenon in common. This dissatisfaction finds expression in the lower schools in the search for methods of instruction which shall arouse and hold the child's interest;

\*Address delivered at the Dedicatory Exercises of Duke University School of Medicine and Duke Hospital, Durham, North Carolina, April 20, 1931, publication in the Southern Medical Journal financed by a grant of funds from Duke University School of Medicine.



in the colleges, by similar efforts to widen the intellectual horizon of students; and in the graduate schools, by attempts to develop students as individuals rather than as stereotyped, standardized products. Underlying this discontent is the realization that standardized mediocrity is the product of any standardized process of education: the student should be allowed a peculiar individual development for the highest intellectual attainments.

With acknowledgment of this dissatisfaction, there is associated almost everywhere a willingness to employ the experimental method, the "trial and error" method, in pedagogical efforts. Education may be looked upon broadly as a biological process, as a process which deals with the life activities of a group of individuals. In this sense, should not educational procedures be subjected to the same type of experimentation as other biological processes, in order that the intellectual development of the individual should be aided and not restricted by the educational program?

While almost every thoughtful person would agree to the use of an experimental plan in education, the difficulty of establishing the proper controls for the biological experiment confronts one with insistence. In most fields of experimentation with living subjects the controls are at best not wholly adequate, so that it is difficult to determine the value of the new endeavor. In the simplest of biological experiments it has been found possible to set up dependable controls, but when one deals with human processes, particularly in their social implications, the limitations of control become very great indeed. In educational procedures, as in other complex human processes, the controls will probably never be wholly satisfactory. Perhaps, in some future age, the biometrician, with a mounting fund of statistical methods, may by random sampling select comparable groups of students to be subjected to the same educational processes, under such conditions that he may be able to tell us exactly the effect, beneficial or detrimental, which the trial methods have had on the intellectual development of the individuals in the groups. But today the yardstick measuring the results of educational endeavors is not adequate for its critical task: one always feels that control is lacking in some essential way.

The limitations of any measuring rod lie primarily in the difficulty of determination of educational values and results. No two institutions ever have identical aims or attract exactly the

same group of students, either in intellectual capacity or physical vigor. No two classes in the same institution will ever be quite the same; the environment, mental and physical, will vary as will the individuals. In spite of all of these difficulties of proper and adequate control, universities, colleges and schools are employing the experimental method as the one promising hope of ultimate improvement of the processes of instruction. It is interesting that mature students very keenly appreciate the opportunity to become part of a trial group in such educational experiments. This willingness on the part of students seems an expression of understanding that the institutions are employing the only weapon fashioned for the attack; it is evidence that current dissatisfaction with conventional methods of instruction has spread from faculty to student.

It must be quite clear to all educators that discontent with educational results has always been, and will, I hope, always be, a phenomenon of university life. But this discontent, this dissatisfaction, shows itself in cycles, in great recurring waves; at the moment the storm of dissatisfaction is almost at a peak. It will, of course, largely subside, to lie quiescent for an interval, and then burst forth again in some new way. Without these periodic storms, education would become fixed, inelastic, static; the periods of stress are those in which improvements are effected.

It is not strange, in view of this present cycle of dissatisfaction with the results of educational programs that in medical schools a similar discontent should be reflected. The primary aim of all medical schools is the same, the production of the best possible physicians, but the training must be of a professional character and not of a trade or vocational nature. Professional schools, especially in medicine and law, are subjected to limitations which do not affect the true graduate schools of universities; they must train their students to meet the minimal requirements established by the various state licensing boards. In itself this limitation would seem to remove from medical faculties the opportunity of conducting their schools with the utmost freedom of academic method, but the licensing boards view their task with the greatest breadth. The main duty of medical schools, the training of physicians, in itself imposes restrictions on educational procedure; this duty is expressed in the courses of required instruction as well as in the general attitude of the medical

faculty. The present disturbed state of mind regarding the conduct of medical teaching is not a new reaction; in periodic fashion it has recurred, as in other educational branches, during the forty years of modern medical education in America. Taking the required curricula as expressions of the medical teachers' viewpoint toward teaching, these four decades tell an interesting story of changing attempts to meet this primary duty of medical schools.

The eighteen-nineties for the first time saw American schools of medicine as integral, rather than remote, parts of universities, with full-time instructors in the preclinical subjects and with a university point of view. This university point of view may be summarized as one in which research is looked upon as an opportunity, as a function of every instructor. In such a school, a teacher must consider his phase of medical instruction not as a finished subject to be presented by didactic methods, but as one constantly advancing; in this advance the teacher must be a participant, if only in a very small way. This attitude of investigation is essential for the establishment of medical education on a true academic basis: research and teaching are indissolubly blended.

In the beginning of this period of modern medical education in America, the practice of medicine was founded almost solely upon pathology, and the medical specialties, as we know them today, were largely undeveloped. The first decade of the present century saw the utilization of chemistry and physics in medical diagnosis and therapy. With the ensuing enlargement of the field of medical practice, an increasing fund of information was available in all departments of medical learning. The result of this widened scope of knowledge, as it found expression in medical education, was an increased number of required subjects and of required hours in the four-year course. The obligatory work, demanded of every medical student, mounted year by year, until at the end of the World War the schedules of instruction were over-crowded by required courses, too many in number and too extensive in content.

The last decade in most American schools has fortunately been characterized by a swing toward a greater freedom of instructional methods and a decrease in obligatory teaching. Standardization of courses, ideal curricula, required number of hours, arrangement of courses, correlation of courses, these had been guiding topics

of medical school administration; but in large measure all these have lost their importance as natural and desirable practices. Today in the better schools the emphasis is on student liberty and on the teacher-pupil relationship in small instructional groups.

All of these changes in attitude toward the processes of medical instruction are, I take it, but signs of a discontent with the results of the teaching efforts. More and more are medical faculties deliberately undertaking to rearrange the required curriculum in the hope that some other distribution of courses, or regulation of the extent of courses, may result in an improvement of the product. Such attempts are merely the application within medical faculties of the same experimental method which is today being so widely heralded for the pre-collegiate and collegiate years. Perhaps it means only that medical faculties are attempting, with new alignments and with new tools, to acquaint changing bodies of students with an increased fund of information; perhaps it is merely a desire to try to do the same thing in a new and different way. In any event the application of the experimental method to medical education results in a wholly desirable thing, a lack of standardization of medical schools and of medical curricula. For with such experimental tendencies in teaching it is inevitable that medical schools should develop along different lines of medical interest, responding in diverse manners to general needs and making the most of their own peculiar local opportunities. Without this tendency towards experimentation, teaching methods in American medical schools would soon become fixed, rigid and standardized; and no progress in professional education would be attained.

Medical education at best is an expensive process: it bids fair, with the increasing scope of each fundamental department in preclinical and clinical instruction, to become even more expensive. Taken in conjunction with hospitalization and the problem of "free" care of patients, medical education will demand even greater sums. But none of this high cost of medical education can be properly charged to the process of experimentation.

This problem of cost is an ever-present one which promises to become the most pressing of all of the problems of a medical school. I need not in any way attempt to justify these increasing costs, for it is obvious to any trained



observer that medical schools in general are hampered in their activities by lack of funds; and like all educational institutions it is likely that this hampering will continue throughout the future. Universities will always find themselves confronted by the necessity of conducting medical courses in the best possible fashion under the limitations of the facilities of the institution, the abilities of the faculty, and the funds available.

These limiting factors necessarily greatly modify the methods employed by medical faculties in meeting their primary purpose of training physicians. It is oftentimes argued that while all medical schools accept this function of training practitioners of medicine as their first duty, some schools emphasize far more the scientific aspects of medicine and others the practical clinical side. The inference to be drawn from this apparent separation of medical schools into two groups is that the teaching procedures differ necessarily for the two types of training. I cannot bring myself to agree to such an inference. It is quite apparent that the faculty of a medical school can devote itself largely to the teaching of the practical aspects of medical practice, but even here the emphasis must be laid upon the fundamental study of disease. Medical teaching must provide a basis upon which the student and practitioner can build: it is far more important to build in the students' mind a method of study, a point of view, than to force him to acquire so-called facts. Any system of medical teaching which lays its emphasis on the acquirement of facts rather than on the attitude of mind is, on critical analysis, found to be based on the conception that medicine and medical practice are static, unchanging, whereas medicine and the practice of medicine change even from day to day. In any well planned medical course, full weight must be given to the rapidly changing conditions and viewpoints of medicine: instruction must be given in such a way that the student leaves the institution with foundation-concepts which will serve throughout his whole life.

These concepts seem to me to be the same guiding motives in medical instruction whether in preclinical or clinical department. The subject matter is presented in such a way that the student is confronted with the basic data of the field; he is given a method of study, a particular technic, whether in laboratory or hospital ward. With these instruments of investi-

gation the student is guided in his acquirement of information; he learns to make trustworthy observations. This view may be considered the expression of a preclinical rather than a clinical attitude regarding teaching of progressing medicine; but I do not believe that these two viewpoints differ at all. That there is a difference in emphasis may perhaps be true, but that is a minor divergence.

I think that most intelligent teachers in medical schools accept certain basic tenets on which to formulate their teaching, whether clinical or preclinical, whether for so-called scientific medicine or for so-called practical work. It will perchance be of profit to inquire briefly just what these guiding principles in medical education are and how they affect the processes of medical instruction.

As I have said elsewhere,\* one of the most important of these principles is that the student in medicine should be subjected to influences which tend to arouse his spirit of inquiry and not to day-long attendance in didactic courses. Such influences look to the immediate or ultimate excitation of scientific curiosity in the student, so that throughout life he will look upon every task, upon every patient, as a problem for study and investigation. For these investigations certain technic must be taught, but the student really must be led to acquire a dominating zeal, an avidity, for scientific inquiry. The arousing of this spirit in the students constitutes a splendid opportunity for medical instructors: it is inspirational teaching at its best.

Another guiding tenet of medical education involves acceptance of the idea that for greatest individual development, the student must be granted utmost freedom in choice of work, the required courses being limited to the minimum and the optional work being as free as possible. Under these circumstances, the required teaching should not be spread over too many courses; what instruction is given should be given as well as possible and with full realization of the changing character of medicine. The critically minded medical teacher soon learns that his function is more that of a guiding agent than that of a pedagogue. The instructor affords the student opportunity to learn under the best possible conditions; but he really is not teaching, rather is he encouraging self-education. Such

\*Some Tenets of Medical Education. Bull. Johns Hopkins Hosp., 45:203, 1929.

an interpretation of the medical teacher's function may seem somewhat restricted, but actually it affords the widest opportunities for intellectual service.

If one were to look upon the arrangement of courses in medical institutions from the standpoint of these principles in medical education, one would conclude that almost any schedule devised on a system of liberal self-education for the medical student would be in the nature of an experimental program; and so of course it is. But can any one in education, and particularly in professional education, judge or predict the result of an educational requirement or of a definite educational set-up? Here again the yardstick which will accurately measure the results in an advancing field of learning is lacking; here again we are forced to rely upon impressions and convictions rather than unassailable findings.

But how, then, are we to conduct the medical school at the present time if the measure of the product cannot be accurately determined? The answer is difficult, due largely to the fact that medical education must reflect, and must respond to, the changing conditions of medicine. To meet the increasing complexities of modern medicine, medical faculties must constantly revise their curricula; and in the process of revision experimental procedures are necessarily inserted. On the whole, the experimental process is beneficial; and the data obtained, while lacking exact control, still have some value.

Duke University has established its medical school at a time and at a cycle phase when medical educators are opposed to standardization of the four-year course and are content to allow schools latitude of individual development. It is an ideal time to try an experiment. I consider it very fortunate indeed that the initiating faculty here at Duke University School of Medicine should undertake a definite experiment, a wholly novel experiment, in medical education, based on certain premises which are debatable, yet which promise much. As I understand it, Duke University proposes first to lower the all-too-great age of medical graduates by requiring only two years of college education, laying emphasis on intelligence and character and on the quality of the courses in chemistry, physics and biology. Then, instead of conducting the course over four years of thirty-three academic weeks each, Duke University offers a continuous year-long process of instruction with a most liberal elective system, so that the student may in three

calendar years obtain credit for four terms of thirty-three weeks' duration. Here is the saving of an entire year by elimination of the long summer vacations which characterize most other medical schools; it presents therefore a stimulating experiment in professional education. Will the student in this process of almost continuous medical work emerge from the school with as good a comprehension of modern medicine as would be afforded by four years with long vacation periods, during which a certain amount of settling-out and assimilation of medical knowledge might be assumed to take place? It will prove interesting indeed to evaluate the benefits and detriments of such continuous educational influences.

It is argued in the catalogue of Duke University Medical School that it is far better for the student to put in additional years of medical tutelage as intern and assistant than to spend them as undergraduate student. In other words, the shortening of the medical course is of advantage if the student will remain in the institution for a year or more after graduation. Whether this contention is true or not the future will tell. The students will possibly lack a maturity which graduates of other schools will have in years and mental ability; to compensate for this lack of maturity, the Duke graduates should have a somewhat greater youthful enthusiasm. And will students under these new conditions be able to acquire the cultural background in medicine which has always distinguished the greatest physicians? The medical faculty here has an opportunity to cultivate this humanistic side of medicine in a group of young and enthusiastic students.

All in all, it is a splendid thing that Duke University in its Medical School should embark on a novel and liberal experiment in medical education. Here is a modern institution built with the preclinical laboratories in closest association with the hospital wards. Physically, the plant leaves nothing to be desired, but in these buildings there is something greater than the structure itself. This intangible element is the spirit of the faculty with its educational idealism. A young group is gathered together, imbued with a spirit of curiosity, not only about the problems of their departmental interests, but also about educational processes. This originating faculty will look upon itself as an educational unit in a great university. It will strive to offer the student the best possible opportunities for learning, for self-education, in



the constantly changing field of medicine. It will strive to stimulate in each student a spirit of scientific inquiry so that throughout his life the graduate will carry on with the ideals and curiosities of a true student.

But not alone on this side of education does the opportunity at Duke University lie open before the medical faculty. It has the opportunity to advance knowledge in medicine through research: the whole field of medical interests lies open before the faculty, in the medical sciences, in clinical medicine, and in the many ancillary branches. This opportunity for research is an essential character of academic medicine; it is the necessary accompaniment of true university teaching in medicine. If anything augurs well for the success of this great undertaking in medical education, it is, in my opinion, the research spirit of the originating faculty and its willingness to start on an educational experiment as expressed in its curriculum, not following blindly the tested arrangements of other schools, but sailing out, in part at least, on the unknown sea of educational procedure. Perhaps this is merely a sign of discontent with what has gone before; rather would I interpret it as a sign of an originality which promises much in medical research and in medical teaching.

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#### CHANGING VIEWPOINTS IN MEDICAL EDUCATION\*

By WILLIAM H. WELCH, M.D.,

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Mr. President, Dean Davison, Members of the Faculty and Staff of the Duke University School of Medicine and Hospital, Ladies and Gentlemen:

It is more than an honor and a privilege; it is a genuine delight to me to have the opportunity of participating in these dedicatory exercises. Your President has indicated perhaps some of the reasons why I, personally, rejoice in this great event. But I am sure I express the feelings of all interested in medical education in this country in recognizing the formal

opening of this medical school and hospital as one of the most significant events in the history of medical education in this country. It is, of course, of national, I am frank to say, of world-wide significance; but, above all, it is highly significant that it can be safely predicted that its influence will extend from this hospital through the South, which is a cause for the utmost rejoicing not only to those who live here, but to those in all parts of the country. I speak not only for myself, but for all who participated in the interesting events of the day. More than that, I venture to speak on behalf of the medical profession of this country, of President Few, Dean Davison, and his colleagues and all who had to do with the inauguration and development to the present stage of this new venture in medical education.

When Dr. Davison asked me to indicate a theme or topic for my remarks, I, without any hesitation, put down the perfectly obvious one of medical education and medical research, knowing that was all-embracing. He indicated that possibly it might be appropriate to discuss with you the history of medicine and our physicians in the South. I did not feel that I could possibly do justice during the time at my disposal to such a theme, especially as Dr. Shryock, of this University, who is a student of the subject, has already made such valuable contributions; but I do recognize that it is a line of investigation and study of the greatest interest and importance and which, I am confident, will be cultivated in this medical school and university. I know, of course, that what I would have to say has already been said much better by other speakers; but I am in the habit of picking the brains of those who have preceded me and, while Dr. Edsall has told in an interesting way the state of medicine of long ago, nevertheless, there is a certain angle of medical history that I cannot escape discussing with you.

You may imagine how forcibly has been brought to my attention on this occasion the contrast between the conditions and the problems which this new medical school and hospital face and those which we faced forty years ago with the opening of The Johns Hopkins Hospital and The Johns Hopkins Medical School, and I would like rather to develop in some detail what has already been said by the others from that general point of view.

Dr. Edsall pointed out the general condition of medicine a generation ago. When we opened the Johns Hopkins Hospital in 1889, and four

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\*Address delivered at the Dedicatory Exercises of Duke University School of Medicine and Duke Hospital, Durham, North Carolina, April 20, 1931, publication in the Southern Medical Journal financed by a grant of funds from Duke University School of Medicine.

years later the medical school, it was approaching the close of what some have called the "golden decade." It was a "golden decade" in the history of medicine. Those who did not live through that period can hardly realize the thrill and enthusiasm attending the unlocking of the great secrets of the causation and spread of that most important group of human diseases, the infectious diseases. During that period were discovered the tubercle bacillus, the bacillus of typhoid fever, the causative agents of pneumonia and Asiatic cholera. One after another these discoveries followed. It was a period of great enthusiasm over the possibilities of the better control and treatment of these important diseases. I was fortunate enough to be brought into early contact with the workers in this field. We all were looking forward, therefore, to the establishment of a hospital and medical school with its opportunity for work in this new field as well as for study in this important and fundamental phase of medical education. There remained, of course, the great field of immunity quite unexplored. We knew the malarial parasite was transmitted by the mosquito, but this was merely the beginning of a new science. I think we might say that an opportunity akin to that which we had, exists now. Today the method of prevention of disease has been so advanced that no medical school meets its obligation in the training of physicians that does not recognize the part the practising physicians play, and their responsibility to the community, in the control and prevention of the spread of diseases.

It is interesting that we dedicate today not only the medical school, but the hospital at the same time. One of the greatest obstacles in the development of medical education in this country has been the difficulty in bringing together the two institutions, the medical school, on the one hand, and the hospital, on the other. We were fortunate, and that has continued to be the greatest asset at the Johns Hopkins, to have had the hospital as a part of the medical school. Seventy years ago it was emphasized that the hospital should be a part of the medical school. The battle is not yet won, still everyone recognizes at present that it is absolutely essential to have the medical school and hospital united so that the hospital shall be in every sense of the word the teaching hospital of the medical school. It is recognized everywhere that a good hospital is an essential part of the medical school, and also that a teaching

hospital is the best kind of hospital. It better serves the interests of the community and the interests of the patient.

Again, we come here to dedicate the medical school which is in every sense of the word an integral part of the University. That was not so in a great many schools forty years ago. Harvard Medical School was an integral part of the University, but there were many medical schools only nominally connected with the university, an insignificant connection. But today, what a change! Perhaps nearly all, with only one really notable exception, the Jefferson Medical School, are true, integral parts of the universities. The medical school receives ideas from the university on the one hand and the university is in turn greatly strengthened by the possession of a good medical school. This close relationship between the hospital and the medical school and the inclusion of the combined institutions as an integral part of the university, a combination which was difficult to secure forty years ago, represents a complete change from the past.

There is another problem which we faced and which I do not think has been adequately solved, even at this time. That is, the adjustment of the professional education and secondary and collegiate education in this country. This problem arises partly as the result of the enormous development of the American college. We attempted a solution at the Johns Hopkins which we never regarded as entirely satisfactory and which is certainly not a national standard, by linking the professional school with the college. We based the entrance requirements upon a collegiate degree. The standard adopted here is the national standard, that is, two years of pre-medical work. Either way is an extremely unsatisfactory solution. Of course, if one links with the college at all, beyond the high school, one must fulfill certain requirements, which are regarded in Europe and England as a part of the general training: physiology, general biology, and so on. In an article by Dr. Davison, which appeared in the *Journal of the American Medical Association*, equal importance is given to the character of the applicants and technical requirements.

While the establishment of the Johns Hopkins Medical School may fairly be said to constitute an important step in medical education in this country, everyone who has given any thought to the subject recognizes that this was merely one of numerous factors that brought



forth the amazing change in our standards of medical education. The examples of a few of the better medical schools indeed had their influence. The change was due in no small measure to the action of the Association of American Medical Colleges; but of the greatest importance were the requirements of the licensing boards. There is nothing comparable to the rapidity with which medical education has improved in this country. The number of medical schools has been cut in half during a decade, while the number of law schools has been doubled. Forty years ago, when we faced the problem of the new medical school at the Johns Hopkins, it was perfectly obvious that it would be almost criminal if we did not contribute something to medical education. Today we welcome the addition of a good medical school.

As regards the character of medical education at that time, the contrast with that of the present, of course, is very great. At this time we cannot contemplate with much satisfaction the history of medical education in this country for the first three-fourths of the past century. At the same time, as I have pointed out, the results were often better than the history. The great need was to establish in the first place the fundamental pre-clinical sciences upon a firm foundation, by establishing all of the pre-clinical sciences, pathology, bacteriology, anatomy, physiological chemistry upon a sound, full-time basis. I think we have made an important contribution in placing the pre-clinical subjects upon this basis. I also think that Osler, in the establishment and conception of a clinic, made an important contribution. It was the first that was really deserving of the name of a medical clinic. I have taken occasion to call the attention of clinicians to the use of the term "clinic," which, of course, bears some relation to the bed and patient. Osler's conception of a clinic was one with a staff, budget, laboratories, and an organization in which those engaged in the work of the clinic, some of them, if not all, were permanently attached to the clinic, a combination of the German conception and the English conception, which constitutes a contribution in that period equal to the establishment of the sciences upon a full-time basis. He could not have done justice to the clinic if he had had an absorbing outside practice. Had not Osler undertaken to establish such a clinic in a systematic and logical way, the situation would not have arisen where no good medical school would agree to put in charge of its clinical de-

partments any one who would not regard them as the major interest and consideration of his life.

It was indicated today by Dr. Weed and others that there is a good deal of dissatisfaction with the result of our modern medical education. As one speaker said, it is characteristic of our profession to be discontented with the existing situation. But in some parts of the world today there is no less an attack upon the methods of training physicians which exist today than upon the training of the scientists in the laboratories. We hardly encounter as frank criticism in this country as in Germany, where there is a belief in the entire separation of the art of healing and the science of healing. This division is as old as the history of medicine. It is almost congenital. You are born of those who place all emphasis upon technical training on one hand, or of those, on the other hand, who place the emphasis upon the science to be applied. I belong to those who believe that the best emphasis is placed upon training in the fundamental sciences, that the routine application is not to be neglected, but I should be most reluctant to believe that the best training for a physician is a purely routine and technical one.

It is the obvious aim of medical education to make good doctors. I was very glad today to meet Dr. Wingate Memory Johnson, of this State, whose article in the March number of the *Atlantic Monthly* seems one of the most sensible and timely articles on medical education and the cost of medical practice. I believe the type of medical man that Dr. Johnson has in mind is better developed with a sound scientific background, without too much emphasis on the technical training of medicine. He places great emphasis on the family doctor and very justly. While the family doctor need not necessarily be a specialist, he should, however, be so well grounded in the science of medicine that he is capable under all circumstances of advising the family whether the patient needs to consult a specialist. I think that type of family doctor or family advisor could be developed better if he had a good scientific rather than technical training.

It is impossible to teach all the contents of medicine. I think the ultimate aim in the medical school is to put the graduate in a position where he can continue a life-long education to the best advantage. The point of view, the spirit of curiosity, a dissatisfaction with merely

accepting conditions; the interests, and I would emphasize that greatly, the interest in the study of the problems of the patient and the problems of disease, these are the matters of first importance. I think all of this is better secured at present in the grounding of the scientific principles of medicine and treatment than in concentrating merely on the routine of the technic. After getting the medical degree, education really, in a sense, just begins. If you put the graduate in that position where he must read intelligently, study intelligently, observe intelligently, it is perfectly obvious that he will develop better with a sound scientific background than with the mere routine and technic. That is what is needed today.

So I emphasize the scientific study of the problems of disease. The real home of research is the university. It would be a calamity if those in the university did not take this view and accept the challenge. I think it is highly important that the members of the faculty realize there is something of special merit in the teaching of those interested in promoting knowledge, not merely retailing something handed down but communicating something that is a part of them, even though the individual may not be a gifted speaker.

One is always tempted to stress the subject that for a decade or more he has dwelt upon. In my case it is the importance of preventive medicine. Preventive medicine stands very high in the reduction of the death rate. It is unfortunate that we have a sharp line between curative and preventive medicine. The graduate should be imbued with a sense of his responsibility to the community as well as to the patient. This was forcibly brought to my attention in the Scandinavian countries. They have such a low mortality, particularly infant mortality, that I tried to find out the reason. One explanation is that they are all trained to have as much interest in preventing the spread of disease as in curing it. All our curricula should be permeated with the idea of preventive medicine. Not merely diagnosis and treatment should be taught, but how the disease originates and spreads and what is to be done to prevent further spreading demands its place. This is a threadbare theme today, but I think more and more that the distinct importance of the preventive aspect should be impressed upon teachers. They should in their turn point out how disease originates and spreads. One reason why

certain parts of the medical field have been encroached upon by public health officers is that they have not been preempted by the medical profession.

But my ratio pro is no longer preventive medicine, but the history of medicine. This belongs to the cultural, the humanistic side. The kind of interest that Osler had adds immensely to the pleasure of the practice of the profession, adds a joy and a relief to it; also makes better doctors. We should consider what that love of books and love of literature on Osler's part meant in his life, in his relation to the students, to the faculty, and to the patients. I have just seen a recent book by Charles Joseph Singer, "An Introduction to the History of Biology." He brings the historical background up to the present conditions of the problem. I am quite sure that the kind of interest will improve the quality of scientific investigators and that it will also make better doctors. The historical side is the principal and about the only one which tends to do that. I plead for a little more of the cultural side in medicine. The doctor is much more likely to have an influence with the community and a grasp of its problems, economic, political, and social, if he has this cultural background. Again, therefore, I would emphasize the very interesting working up of medical history in the South. You have here a field which I believe is already explored to quite an extent. There is a great contrast in many ways between the fundamental problem which this medical school faces and those which we faced forty years ago in the enterprise at the Johns Hopkins Medical School. The very fact that there has been this change in the problem is significant. We should never allow the curriculum of medical training to become rigid. It should always be in a state where it can adapt itself to changing conditions and knowledge.

In conclusion, let me say, Mr. President, I would like to thank you, Dr. Davison and all who have been concerned in the arrangements for this extraordinarily interesting day, and to express appreciation for your hospitality and the stimulus we have received. It has been a perfectly wonderful day; it is more than a delight; it is really the fruition of the hopes and wishes of one who has engaged in medical work for more than fifty years, an experience which gladdens one's heart.