SCIENCE

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*THE DUTY AND RESPONSIBILITY OF THE UNIVERSITY IN MEDICAL EDUCATION.**

AN experienced railway engineer once told me that when about to establish a grade for a line or railway across a mountain chain he no longer started at the base of the mountain and endeavored to seek a practical ravine or water course through which the line might be led upward to the top of the divide and thence down to the plain below on the farther side of the mountain. He had found from experience that to pursue this course involved him in bad grades and increased difficulties of construction. This method of survey, which lacked a comprehensiveness of plan and breadth of detail so essential to secure the best route, has been abandoned after long trial and by many engineers. His present method was to examine the mountain range first to discover the most feasible passage at the higher level, and when he had once found it he was able to determine with comparative ease the grades required to connect it with the base of the mountain, and could then construct the most practicable and least expensive route.

It is my purpose to-day to urge that medical education be similarly approached from the vantage point of the university with its lofty standards, rather than from a lower point of view, with the hope that

* Annual address to the graduating class in the Yale Medical School, June 23, 1903.

we may be able to perceive more clearly its vital relationship to higher education and its absolute dependence as a growing, progressive science upon the stimulation afforded by university methods, aims and ideals.

To discuss an educational question before university men suggests the appropriateness of the quotation from Confucius with which an eminent scientist once prefaced an address made under similar circumstances: 'Avoid' the appearance of evil: do not stoop to tie your shoe in your neighbor's melon patch.' A member of the teaching staff of one of the newest schools of medicine ought to display a degree of modesty in the presence of medical teachers whose thoughts and activities have been molded by the traditions of one of the oldest medical schools in the United States, the sixth in point of time of establishment, and should hesitate above all to urge the duty and responsibility of a university in medical education. I am sure, however, that you will pardon the liberty which I take, for the reason that the relations of medical education to other forms of education and to other parts of the educational system are still unsettled, and it is the privilege, and no less the duty, of all medical teachers to contribute something towards the development of medical teaching from a special and inferior position, until it attains what I believe is to be its final adjustment as one of the highest branches in the general system of university training. Perhaps I may also plead in mitigation of my indiscretion a degree of hereditary relationship to Yale in the fact that my father graduated here in medicine in 1830; my grandfather was a student about 1795, but did not graduate; my great-grandfather graduated in 1778; and my great-great-grandfather in 1739, and may speak as one whose speech can be tolerated because of kin, albeit remote.

In the original development of medicine there was little necessity or opportunity for its scientific study, because the physician was nothing else than a priest. By the access to the gods which his office afforded, and his presumed knowledge of their modes of thought and springs of action, he learned how to influence them, and hence became skilled in the treatment of disease. It was apparently altogether an era of preventive medicine. Disease was universally regarded an evidence of the wrath of an offended deity, and the only way to prevent its ravages was to appease the divine displeasure. If the deity was prevailed upon by prayer or persuaded by sacrifice to hold his destroying hand, disease disappeared. The theory of disease was simple and the methods of cure were obvious. A knowledge of the laws of health and disease was not required. It was only requisite to keep on good terms with the divinity and not to anger him by neglect or sacrilege or presumption. This was the medicine of Moses, of Job, of Homer and of semi-civilized people still the world over.

Later, when the conception of the power and malign influence of the inferior gods of the underworld developed, the physician who had formerly been a priest solely, became in addition a magician and wonder worker to the end that he might overcome the machinations of evil deities by invoking the aid of good deities or compelling the assistance of more powerful and possibly more unscrupulous deities than those who had originally produced the disease from motives of pure malevolence and hatred to mankind. He studied not the law of disease, its mode of manifestation and the remedies which would cure it, but rather sought to ascertain who was responsible for it and what magical rites

and formulæ would counterwork his power. In some instances, in fact, the physician attempted by magic to compel the powers of darkness to act in opposition to each other, and thus, by dividing their power for evil, to rescue the victim of their cruel wrath. Unless the physician's magic influence, or his *orenda,* to use the Indian word given by Powell to express the influence which he thus acquired over deities with mischievous tendencies, was competent to accomplish this result, he was regarded an unsuccessful practitioner and had little fame and less pecuniary reward.

While among many barbarous nations the priest and physician became one and the same, and the physician soon degenerated into a magician and wonder-worker, the conception of disease as a visitation of God has never disappeared, and even now dominates belief and influences conduct. Disease is considered a judgment upon a sinful individual or an erring nation, to be removed by fasting, humiliation and prayer, rather than by remedies and sanitary measures. I have witnessed a day of fasting to arrest the scourge of cholera, and a few days ago I read in a newspaper of the blessing of throats with prayer and candles upon a saint day to prevent the development of diphtheria. Allied to this is also the Christian Science conception of bodily disease as sin, due to a lack of faith in the power and immanence of God. If such conceptions are true, why should we study medicine at all? As students of rational medicine we believe otherwise. At any rate, we do not go to so-called religious teachers to learn the scientific laws of health and disease.

The early conditions of pioneer life in America were not such as to foster the study of medicine. It is true that many well-equipped medical men, educated in England or on the continent, emigrated originally with the colonists and practised the healing art among the early settlers. These men, however, raised up in their turn an inferior class of practitioners through a system of apprenticeship. Apprentices were found in all parts of the country who saw the sick in connection with their preceptors, and thus acquired a degree of familiarity with the aspects of ordinary disease. Opportunities for the study of medicine in the modern sense did not exist. There were no schools of anatomy or facilities for dissection of the human body. A few practitioners after the expiration of their apprenticeship went abroad to Aberdeen, Edinburgh or Leyden, but the majority were prevented by poverty and lack of leisure from availing themselves of these opportunities for medical study. Dr. Welch in a recent address here has called attention to the clerical physicians who flourished in New England, ' those ministers of the soul and comforters of the sick ' who did much to keep the spirit of scientific medicine alive but who probably did comparatively little to promote the better study of medicine. They were amateurs rather than physicians. They enjoyed medicine and dabbled in it, but did not live by it. An occasional woman also at this early day bore an honorable part in practical medicine. Ouchterloney, of Louisville, for example, speaks of Mrs. Frances Coomes, of Kentucky, in the middle of the eighteenth century, who was probably the first female physician upon this continent. She was self-taught, but had remarkable vigor of intellect, originality, fertility of resource and strength of character, whose fame as a surgeon, physician and obstetrician extended far beyond the limits of her state. Her operating table was a huge black walnut log, whose upper surface had been rudely smoothed, her instruments were fashioned by herself from domestic cutlery, her ligatures were

obtained from the hides or sinews of deer, and her remedies were the products of the field or the forest about her.

The first attempts at medical instruction in America were made in private schools which supplemented the systems of apprenticeship just mentioned. Cadwallader of Philadelphia, Hunter of Newport, and Shippen of Philadelphia, all in turn gave private demonstrations in anatomy, as this department of study for obvious reasons was inadequately taught under the apprentice and preceptor system. The step from private to public medical schools in connection with existing colleges was soon made. The first, now the University of Pennsylvania, was established as a department of Philadelphia College in 1765; King's College, now the Medical Department of Columbia University, in 1767; Harvard Medical School in 1783; Dartmouth Medical School in 1798; the University of Maryland in 1807; and Yale Medical School in 1813. It is gratifying to note that all these schools were established in connection with well-known and well-established institutions of learning, and were not independent and isolated schools of medicine alone. The movement which brought about the establishment of the Yale Medical School, it should be remarked, came from Yale College, through President Dwight. They were an outgrowth, however, of pioneer conditions and their primary purpose was to furnish medical teaching to supplement the apprentice and preceptor system. They gave courses of lectures on the science of medicine; practical or, rather, clinical work followed under the preceptor. The system was a necessity in a new and undeveloped country, sparsely populated and poorly supplied with medical men. It was a product of American soil, and not an imitation of conditions abroad. These schools were established by well-trained, scholarly men, and the medical instruction given was fully equal to that given in law or theology, where a similar system of preceptors existed. Entrance examinations were required and the same standard of education and fitness exacted as for admission to college. Unhappily this standard of educational requirements so essential to a learned profession was not long maintained. After 1820, and for a half-century and more, medical education steadily retrograded and standards for entrance to medical schools and for graduation were progressively lowered. Schools of medicine upon a commercial rather than an educational foundation sprang up far from centers of population or facilities for clinical teaching, and degrees were conferred upon persons who were manifestly unfit to enter the profession. The majority of these schools were not attached to any institution of learning, or, if nominally attached, they were destitute of any vital connection; they were parasitic growths, like the mistletoe upon the oak, having neither the leaf nor the fruit of its presumptive parent stem. They were founded in every part of the country, and the study of medicine was promoted by one or more short courses of lectures, generally of three or four months' duration, without practical work, too often given to young men of very limited education. The same courses were repeated year after year to the same students, and no difference was recognized between the instruction given to the man about to graduate and the one who had just entered upon the study of medicine. Medical knowledge flowed like the blood-stream in the human body, and every student was supposed to be able to select and to appropriate what was most needed for his growth and mental development. As a witty friend expressed it recently, medical knowledge was pumped

into these students by didactic lectures, to be pumped out again by the final examination. The quantity which was thus 'recovered,' to use a chemical phrase, was sometimes painfully small and generally of little practical value.

In a generally gloomy outlook for adequate medical training a few brighter spots developed. It is gratifying to know that during this whole period Yale Medical School made a strenuous effort to maintain a higher standard. She early exacted a matriculation examination and increased the term of medical study; she inaugurated daily recitations in 1855 to supplement didactic lectures, and established laboratory courses in 1867.

In 1864 Chicago Medical College, now the Medical Department of Northwestern University, graded its course of lectures and made the minimum course three years.

In 1870 Harvard Medical School initiated a similar movement and taught medicine progressively rather than cumulatively. The University of Michigan also extended its course of instruction to three years of nine months each, and made some minor educational requirements for admission. For the most part, however, the preliminary education required was ludicrously inadequate, when one considers that the medical school essayed to fit the individual to enter a learned profession. In some catalogues it was specified that the student should have a knowledge of grammar, orthography, arithmetic and an ability to write a composition of six hundred words. In others it was stipulated that the student should have a high school education and a certificate of good moral character. Whenever any attempt was made to raise the educational standard, pathetic appeals were made successfully in behalf of communities where it was alleged that well-educated physicians could not be maintained or appreciated.

It is doubtful whether this unfortunate state of affairs would have been remedied for many years to come had the initiative been left solely to those who were charged with the responsibility of giving instruction in these so-called medical schools. Fortunately, however, public-spirited medical men were found in almost every state in the Union who insisted that men should not be permitted to practise until they had shown their competency and education by passing an examination before an impartial examining board. This was the beginning of a reform in medical education which dates from about 1890, and which has already changed the aspect of medical schools. The object of medical teaching up to this time had apparently been to fill up the profession by making it easy for every one to enter. The object now seems rather to secure well-trained men with an adequate education.

With the advent of the new era came a minimum standard of educational qualification for entering medical schools, a minimum period of study and a minimum grade of acquirement in order that the graduate of the school might be considered eligible for an examination for a license to practise, all of which were far in advance of what had existed. This has enforced a better preliminary education, a graded course of study, and a higher standard of attainment upon graduation.

It has been said in the past, is now being said, and will be said in the future, as an excuse for poorly equipped physicians, that well-educated physicians are not required in rural districts or where the population is sparse and the people are poor. An early experience in semi-pioneer life convinces me that this is an error. The well-educated physician does not avoid the country, nor does he leave the country for the city after he is once established. The list of eminent medical men who have lived

in the country and still continue to reside there is a long one. Not long ago I had an interview with a physician who resides in a little village in the mountains of North Carolina, and who had gone forty miles to a mountaineer's cabin a few nights before to trephine an incised wound of the skull successfully by the light of a coal-oil lamp, and to remove a knife blade which had been broken off in the wound and which was giving rise to serious and rapidly fatal brain symptoms if relief had not been afforded. He made the diagnosis and performed the operation which snatched the patient from certain death, from his knowledge of cerebral localization. Similar instances of modern knowledge of medicine among country practitioners are frequent. As a matter of fact, the half-educated physician is much more apt to settle in the crowded city than in the country, and the descent into quackery and charlatanism is more easily made there. A good education, I do not say a college degree of necessity, preliminary to the study of medicine is after all the surest safeguard against a misapplication of the knowledge which the physician has acquired.

In the study of medicine we find a combination of technical and theoretical knowledge rarely required by any other profession. The amount of actual knowledge which the student must acquire by an act of memory is truly appalling. I heard not long since of an elderly physician who apologized for his failure to keep pace with the progress of pathology and bacteriology, by reason of his age, but added with pride that he once knew the names of all the bones of the human body. I think every physician may reasonably feel a similar and lasting pride in his feats of memory as a student. The student must know the names, relations and functions of the bones, the arteries, the nerves, the viscera, the nerves of special senses, the brain and spinal cord, and in fact everything about every organ of the human body. He must also know materia medica, pharmacology, chemistry, physiological chemistry, physiology, pathology, bacteriology, hygiene, clinical microscopy and the laws of health and disease. In addition to these branches he must know disease itself in its various manifestations, and learn how to recognize it and how to treat it. In medical study he must cultivate his memory, his powers of observation and his ability to reason from obscure phenomena. He must cultivate his hand to do and his eye to see. While there is still, especially in seeking the causes of disease, much blind groping, medical diagnosis as a whole is no longer an iridescent dream but a growing certainty. Take, as examples of this, malarial fever, tuberculosis, typhoid fever and diphtheria. No one now needs to be long uncertain as to the presence of these diseases, or, if he is, his uncertainty is due to his own lack of training and medical knowledge. And yet I would not be understood as asserting that all the problems of health and disease are equally free from uncertainty. There are difficulties inherent in the factors of the problem which often lead to doubt and uncertainty in the mind of the best trained physician. We can not shut our eyes to the fact that disease is not an entity, an organized enemy of health which attacks the body in a uniform manner, and is to be cast out as a burglar or a midnight intruder is thrust out of your bed-chamber. It is rather the personal reaction of the body of each individual in its own way and in accordance with its own constitution against the morbific agency. The portal by which the same disease enters different individuals may vary widely, the extent of the reaction may vary as widely, and the virulence of the original poison may also vary to an

equal degree. Hence the problems of disease and cure may become most intricate, and over and over again many of the phenomena are in danger of being confused and wrongly interpreted. It has, for example, taken a long time to recognize the fact that the rise of temperature in pneumonia, typhoid fever or tuberculosis is not the disease itself, but merely a symptom of the disease process. Even now we find many physicians whose theory of treatment in these disorders is to combat the rise of temperature by antipyretics, and who honestly think that the patient is cured by subduing what is merely one of the symptoms of the disease. The same was once true of those who thought maniacal excitement was cured by mechanical restraint and by powerful remedies which paralyzed and deprived the patient of his ability to throw himself about. We now know that he was not cured by thus removing the evidence of his disease—in other words, by keeping him quiet—but, on the contrary, his prospects of cure were infinitely lessened by the restraint which the strait-jacket and drug thus imposed upon him.

The demonstration of the presence of a specific organism as the causative factor in the development of many diseases has consequently been a great boon to medicine and has become essential to a proper recognition of the disease and its best mode of treatment. The time may come when the cause of every disease will be equally well known, and to ascertain it is one of the great aims of medical research. Unfortunately, the end is not yet, and in the case of some diseases we must content ourselves with our present half-knowledge.

We now come to the important question: 'How shall medicine be studied?' Here we find ourselves confronted by two theories as to the preliminary training requisite for entering upon such study. On one side we find a strong tendency to shape all preliminary training to prepare the student for medical study. If the preliminary training is to be in a college, we find already in a number of institutions such an arrangement of the course as practically to commence the study of medicine in the third year of the college course and to complete the medical education within two years after graduation from college. In the University of Michigan, Cornell University, the University of Chicago and other similar institutions of high standing this plan has been outlined and will be eventually adopted. Although the bachelor's degree will be considered a preliminary to entering the medical school, the studies of the college will be so combined with those of the medical school as to permit the student to complete his medical course within six years after he has entered college.

On the other side, there is a tendency to divorce the medical education from the college course and to pursue the latter for general culture, irrespective of its bearing upon medical study later. Much may be said in favor of both theories of education. The last-mentioned theory unquestionably presents the broadest view and, if the student has ample leisure, offers the best promise of a true education. It can not be denied, however, that the former view is likely to be more generally adopted and promises to dominate medical education for a time at least. If the student always knew when he entered college that he was to pursue the study of medicine, he might possibly, in these days of elective studies, be able to choose wisely the branches which would best fit him for his subsequent work. In many instances, and perhaps in the majority, the decision to enter the profession grows up slowly and may not be fully attained until he has finished his course of preliminary study. It is altogether probable that he has secured a broader mental

training than if he had contemplated medicine from the commencement of his education and may be equally well fitted to pursue the study, but he finds himself at least one year, and possibly two years, behind his fellow student who had medicine in view from the beginning. For this reason it is probable that the majority of colleges will give elective courses, beginning with the junior year, which will lead immediately to medicine, and that many students will be forced by circumstances to make this early decision.

This hasty and somewhat patience-trying review, I fear, of the circumstances of medical education hitherto in America prepares me now to speak of the duty and responsibility of a university in medical education.

It is apparent that the present requirements for medical education have become so expensive and exacting that schools which have hitherto been maintained as commercial ventures and for the private gain of their owners can no longer be profitable if they honestly seek to do their duty towards the student. Expensive laboratory courses are required in histology, embryology, anatomy, physiology, bacteriology, pathology, clinical microscopy, pharmacology and physiological chemistry. They necessitate much apparatus, many salaried instructors who are precluded by their duties from adding to their income by private practice, and a limitation in the size of the class to permit of personal work. Former methods of medical instruction dealt with students *en masse;* present methods must consider individuals, and the unit of instruction becomes one person instead of five score. If this altered educational condition is to be honestly met by a school which depends upon its fees for its support—and to the credit of many schools, it should be said that they are making the most praiseworthy efforts to meet the requirement—it means a loss of income and an ultimate extinction of the school. With many of them, in fact, the end is not far off. They already suffer from Falstaff's incurable disease—'consumption of the purse.' On the other hand, if the situation is not fully realized and frankly met, we must be prepared to see the commercial school retaining its profits by furnishing insufficient medical instruction and an inadequate training. The medical man is thus fitted, as in the past, to become a practitioner rather than a student and a teacher. To modify a phrase used by another, 'such schools can do something for learners and but little for learning'; in other words, they can help make the doctor, but not the science of medicine.

The present situation, then, demands that schools connected with universities shall perceive the need of the student and protect him from imposition by affording him instruction of a high standard. The university, in fact, must set the standard. The working of the law of supply and demand, it is universally agreed, is no longer adequate to supply the higher education. It must be endowed by individuals or furnished by the state. Individual enterprise and initiative can no longer be depended upon to teach astronomy, the classics, higher mathematics or any other than technical or purely bread-and-butter branches. Medical instruction consequently can not be left to the initiative of the private school any more than can instruction in any other form of higher knowledge. If instruction in medicine is to form part of the university curriculum, the work should be done thoroughly and in such a manner as to add to the dignity of the science. I am aware that, mainly because of the imperfect preliminary education required for admission to the study of medicine, there has always been a query

in the minds of university authorities as to the status of medical science and its claims to be considered a liberal study. The medical student at a university was formerly far from being a matter of pride to his alma mater. His relation to the royal family of letters was apparently a morganatic one. He did not appear on public occasions, was very little in evidence on commencement day, and generally passed without much flourish of trumpets from academic halls to the seclusion of private life. Whatever medical science may have once been in comparison with other sciences, I have no hesitation in saying that now it is the peer of any. Although only the child of the past half century, it can boast of a brilliant series of discoveries. Compare the knowledge which has been acquired of the causation of malaria, yellow fever, tuberculosis, the assured benefits of the diphtheria antitoxin, Haffkine's plague vaccination, Pasteur's anti-rabic inoculation, and the like, with the achievements in any other branch of science. Think of the mental training required to settle the problems of immunity, to investigate questions of bodily metabolism, to know the true action of remedies, and to discover the law of diseases and their mode of cure. Physiology, pathology, hygiene, practical medicine, psychiatry, these are all living branches of medicine which require the highest training which can be given to the human mind to fit it to solve the problems which they present. The medical man needs to know chemistry, biology and physics; he must be trained to use his mind, and to reason from obscure, often imperfectly known, factors. He must be a diligent student of the laws of mind, and keen to observe mental phenomena. Above all, he must have a training of the head and of the heart to fit him for the true exercise of his profession and to deal with problems of the highest importance to the welfare of mankind. Are not such studies worthy the attention of a university, and should not she feel the duty and responsibility of providing adequate teaching for them?

Probably no better illustration could be given of the influence of university ideals upon medical education than is afforded by what has been done in one of the departments of Yale University to promote and develop the study of physiological chemistry. I have no hesitation in saying that the impetus which has been given here to this most important department of chemical study and research has been felt by every medical school worthy the name in America. To Professor Chittenden and the Sheffield Scientific School is due the honor of initiating a most important and heretofore neglected branch of study—one which would probably never have been developed by a school unattached to a university.

The university occupies a vantage ground enjoyed by no mere medical school. She is unselfish, and by reason of her endowment is able to view all educational questions in an unbiased manner, regardless of their effect upon mere numbers of students. She stands for knowledge and truth. She can afford to disregard the mere question of filling up the profession, and need only consider the proper education of competent men. The country suffers from too many medical schools and too many imperfectly educated men. The university is alone competent to limit the production and to improve the quality. The intensely practical studies of the physician, upon the one hand, need the broadening influence of a university atmosphere to bring every branch of science into its proper relations, and to give a proper perspective. The university, upon the other, needs and should foster departments like those of medicine to avoid a

dilettanteism which regards culture as an end and not an adjunct of life. I have sometimes thought that, with the increase of luxury and wealth, and especially with the increase of a leisure class, there has been an increase of those persons who pursue a college course without special purpose or aim. Many of these, in fact, pass through their course without attempting severe study, and are content with the passing joys of an undergraduate existence. Like oarsmen in a boat, they constantly fix their eyes on a receding shore, are satisfied with what they see and do not look in front of them. To such the mental stimulation which comes from university contact with eager, earnest men engaged in branches of medical study which call into keenest activity every faculty, must prove of untold benefit.

Too many medical men reason from case to case as did John Hunter, and frequently these cases are imperfectly observed and inadequately interpreted. The physician needs rather a study of principles deduced from a systematic and painstaking observation of the phenomena of disease and illuminated by scientific conceptions. Already anatomy, physiology, chemistry, bacteriology and pathology are firmly founded upon the scientific method. The practise of medicine and of surgery, pharmacology, food dynamics and bodily metabolism must be similarly based upon scientific deductions. The range of observation required must be wide and the mass of accumulated facts to be gathered for ultimate study must be enormously large. The task of interpreting such observed phenomena calls for the widest training of the human faculty, and where else can this training be secured except in connection with studies of the broadest and most liberalizing character? From every point of view the intellectual aspect of medicine is the most important. To men who have been trained by university studies for research we must look for the future development of medicine. The training of the medical man has been narrow in the past; in future he must draw his inspiration from centers of learning and receive stimulation from his intellectual peers.

A lack of thoroughness is thought by those who are familiar with the educational and industrial development of the world to be a characteristic of the American people. We grasp after results, but are not willing to lay a broad foundation of preliminary education. We have business universities (once commercial colleges), summer universities, correspondence universities and the like, and seek to get knowledge and to secure degrees in the shortest time and with the least possible study. In no profession has this lack of thoroughness wrought so much evil as in the study of medicine.

To you who are to receive the degree of doctor of medicine I offer a hearty word of congratulation, because in the study of medicine it is possible to combine research and practical work, that is, the acquisition of pure knowledge with the application of scientific knowledge to the better care and treatment of sick people. Nothing in my judgment is so stimulating to the student as the possibility of applying scientific knowledge to daily use. I can not speak so positively of other sciences, but I can assert that in the history of medicine it has been found that he who makes the most fruitful discovery is the one who has approached the problem which he attempted to solve through the avenue of practical work. Men who sit down in the privacy of their chambers to make discoveries lack the incentive to produce practical results which comes from actual contact with the outside world and with the hard-and-fast conditions of nature.

Hence whenever I hear complaints on the part of busy practitioners or teachers of medicine that time is absorbed by routine work which in their judgment might be much more profitably spent in research work, I do not always lend a consenting ear to the complaint. I have known many laboratories where teaching was not required which failed to do the work for which they were established. I have known many other laboratories, seemingly overwhelmed by routine work, in which the daily discharge of practical duties led to profound and life-giving discoveries. I would say in passing that it seems to me that under the endowment of research work made by Andrew Carnegie at Washington, the decision not to build a laboratory for special research but to seek out research workers among practical students in the various technical and professional laboratories of the country is eminently wise and philosophical and well calculated to bring larger returns than would be possible in a single laboratory divorced from the every-day practical pursuits of a technical school or university.

For this reason, at least, students who are developed by the smaller colleges are frequently to be congratulated. They become self-reliant, they learn to meet difficulties, they study for love of knowledge and their enforced contact with nature stimulates the scientific sense and makes them productive workers. I have little sympathy too with the study of problems which have no practical value and are mere intellectual gymnastics.

It is not those who have had the most abundant leisure or the best facilities for study who have accomplished the most. Take the historian Parkman with his feeble health, his impaired eyesight and his general state of nervous exhaustion which often permitted no more than five minutes of effective labor each day, and consider how much he accomplished by perseverance and by concentration of purpose and effort. Take Pasteur, not even a physician, yet wrestling mightily and effectively with the problems of disease, handicapped by poverty, paralysis and inadequate laboratory facilities and consider what the world owes to him. Nor do such men belong wholly to the past. All students may draw inspiration and learn humility from a teacher of chemistry at a western university who, deprived wholly of sight by a cruel accident, has had the resolution and fortitude to continue his work as a teacher and investigator, and who has attained scientific results highly creditable to himself and to the institution with which he is connected. The search after scientific truth has the advantage that it does not depend upon externals, but rather upon the intellectual force of the individual; not upon the outward man, but the indwelling spirit.

In your chosen profession be students and productive workers always. Do not look for speedy results and do not be discouraged if the secrets of nature are not wrested from her jealous grasp without a severe struggle. The foundations of our art are broad and deep, and the superstructure should be erected slowly and with care, by accurate observation of disease and painstaking deductions. In your life as physicians be prepared for trials, disappointments and adversities. Take for your motto the words written by Sir Thomas Browne, that eminent physician, more than two centuries ago. "In this virtuous Voyage of thy Life hull not about like the Ark without the use of Rudder, Mast or Sail and bound for no Port. Let not disappointment cause Despondency nor difficulty Despair. Think not that you are Sailing from Lima to Manillia, when you may fasten up the Rudder and sleep before the Wind; but expect rough

Seas, Flaws, and contrary Blasts; and 'tis well if by many cross Tacks and Veerings you arrive at the Port; for we sleep in Lyons Skins in our Progress unto Virtue and we slide not, but climb unto it."

Have a purpose and carry it out with fortitude. There can be no more absorbing or inspiring career than is afforded by the study of medicine at the present time. The scaffolding reared by countless workers during thousands of years around the fair temple of medicine, necessary for the building doubtless, but concealing its proportions and too often defacing its beauties, has been swept away and for the first time it is permitted to us to know something of the dimensions and architectural possibilities of the completed edifice. Can there be a nobler aspiration for any man than to assist in the completion of the work of transforming the ancient art of healing into the science of medicine?

In my childhood in a far distant state I daily heard from the lips of an aged relative the story of Yale College and New Haven as she had known them at the beginning of the last century. Her tales of the many scholarly activities of the first President Dwight, of the scientific zeal and achievements of the elder Silliman, of the boundless industry in many fields of Noah Webster and of the profound learning and influence of Dr. Æneas Munson, presented ideals of life and possibilities of scholarly attainment which have remained with me ever since. Those who have been engaged in educational work here during the past two centuries can have had no conception of the silent influence which Yale has exerted upon the training of generation after generation of men throughout the whole land who have never visited New Haven nor come into personal contact with the eminent teachers who have gathered here.

Mindful of my own indebtedness to Yale, wholly indirect, I am not guilty of overstatement when I say that I regard the honor of an invitation to address you to-day as the most cherished academic event of my life. I regard the honor, however, in no sense a personal one, but deem it rather an evidence of the good will and amity which has ever characterized the relations between Yale and other schools and teachers. The university with which I am connected and which in a sense I represent to-day is equally her debtor for scholarly inspiration and example, and in her name as well as my own I would render most grateful and appreciative acknowledgment.

Henry M. Hurd.
Johns Hopkins Hospital.

*THE NEW DEFINITION OF THE CULTIVATED MAN.**

The ideal of general cultivation has been one of the standards in education. It is the object of this paper to show that the idea of cultivation in the highly trained human being has undergone substantial changes during the nineteenth century.

I propose to use the term cultivated man in only its good sense—in Emerson's sense. In this paper he is not to be a weak, critical, fastidious creature, vain of a little exclusive information or of an uncommon knack in Latin verse or mathematical logic; he is to be a man of quick perceptions, broad sympathies and wide affinities, responsive but independent, self-reliant but deferential, loving truth and candor but also moderation and proportion, courageous but gentle, not finished but perfecting.

There are two principal differences between the present ideal and that which prevailed at the beginning of the nineteenth century. The horizon of the human intel-

* From the presidential address of Dr. Charles W. Eliot, before the National Educational Association.