SCIENCE

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ADDRESS DELIVERED AT THE OPENING OF THE SEVENTY-SEVENTH SESSION OF THE ALBANY MEDICAL COLLEGE, SEPTEMBER 24, 1907

Gentlemen: We assemble to-day to inaugurate the seventy-seventh lecture session of the Albany Medical College. The need of any formal beginning has often been questioned, but the custom has been long established and there seems to be a certain propriety in maintaining old forms when they do not impede modern progress. To those here present who to-day begin, in a definite way, their medical study, this hour, which marks their entrance to a noble profession, is fraught with interest. It is for them a point of departure, and at such a time it may be that some, even of the seemingly insignificant things, said or done may make a lasting impress upon the mind, influence thought, or cast new light upon some problem which confronts them. In this hope I shall presently address myself particularly to these newcomers who eagerly, perhaps anxiously and very seriously, anticipate the experience which coming years have in store, but first of all it is proper that, as a representative of the faculty, I should extend to you all a most cordial welcome. Those who are coming back again feel, we hope, at home in their surroundings, and need not to be assured that they are welcome, but to him who is as yet a stranger within our gates we ex-

tend most cordial greeting. It is our hope that he may be one with us in all the aims and interests which we have in common, and that no seeming indifference on our part, or aloofness on his, may hinder him from taking the place to which he is entitled and obtaining every advantage and benefit which comes to those who are engaged in a common pursuit if so be they will ally themselves with their fellow-workers and thus secure their share of the inspiration to be derived by those who are bound together by a common tie and are striving to reach the same goal. To this community of interests I shall later on allude, because I am convinced by long experience that no little evil and loss comes to some from lack of proper apprehension of this matter, and while it may be that those who are continuing and not entering upon their studies here, and whose student habits are in some measure established, will be little influenced by anything said, I am encouraged to hope that some of those who find themselves in new surroundings may be ready to receive some new truth, or view some old one in a new light, so that it may impress itself upon the mind and influence in some degree their conduct. And this, as already intimated, is one of the advantages which such occasions as the present possess—that there are certain days in life and periods in the history of every individual when even the little things make their mark and find a lodgment in the memory. Which fact affords, as we have seen, some reason, or at least excuse, for such observances as this, which however perfunctory they may seem to some are yet by no means devoid of interest to others and may be made in some degree profitable to those who are disposed to view them aright.

This occasion has for me no ordinary interest. I stand to-day where on a similar occasion and for a like purpose I stood thirty-two years ago, and again twelve years ago, and as the duty which has for this third time been delegated to me is assigned in rotation to the members of our faculty it is in the highest degree improbable that I shall ever discharge it again. For many years as student and instructor, and for twenty-five years just closing as registrar, I have been connected with this school, and I can not look about me without recalling the faces of those under whose instruction I sat, whom personally I have known, or with whom as teacher I have been associated, many of them long gone, who from this place have addressed successive classes occupying the seats which you are filling to-day. Two of these were founders of the school—the brilliant surgeon March, and the versatile and accomplished anatomist Armsby, whose faces look down upon us from the canvases before you, and among those who at a later period became connected with the school were Dean and Harris in medical jurisprudence, and the dignified Scotchman of the old school, McNaughton, and the elder Vander Poel in the department of practise; Quackenbush and Seymour in obstetrics; Pomfret and Webster in physiology; Haskins in anatomy; Lansing in materia medica, and Porter, J. S. Mosher and Perkins in chemistry. Coming into the faculty later, and after its reorganization in 1876, were Swinburne in surgery, Gray and E. R. Hun in neurology, and F. Townsend in physiology. Dr. Thomas Hun had withdrawn from active participation in college affairs before my time, though he served as emeritus professor and dean of the faculty from 1876 until his death twenty years later, and Dr. Howard Townsend had just passed off the scene when I came on it as a student. These men and many others, for I have named only those whom personally I have

known and none of the living, will be remembered so long as the history of this school shall endure, for they labored zealously in creating, upbuilding and successfully maintaining it. We do not recall the fact to find warrant for our present existence, nor can we claim lenient judgment for present performance by reason of distinguished services rendered by our predecessors, but we may find both incentive and encouragement in the contemplation of their work, and I take it that it is as true of institutions as of individuals that a line of reputable ancestors is something to be thankful for and on the whole no unimportant asset.

The place in which we meet compares but indifferently perhaps with the showy buildings in which many schools are housed. To the newcomer it may not be impressive, but since mind is more than matter, individuals more than piles of brick and mortar, and an elegant material environment in itself no evidence of intellectual profundity or productivity in its tenants, you need find in this fact no reason for discouragement. Plato in the groves, Socrates in the streets of Athens and Christ in the market-place, remain types of the true scholar and real teachers of mankind, and while conditions have changed essential truths are in no way altered. Our academies need a better housing than groves afford, and our teachers a more elaborate apparatus than sufficed for ancient philosophers, but in our thinking we should take care to estimate things at their real and not at fictitious worth or we shall place too high a value upon material things in the sphere of education and science. Here the real values are incorporeal, intellectual and spiritual, not material and directly convertible into dollars, nor are they directly producible by wealth. We stand in a great library, perhaps under the dome of the British Museum. Here are a million books collected at great labor and cost from all parts of the world and containing much of its best wisdom, but they are powerless to impart their knowledge to those who merely stand and gaze. And even he who longs to learn that which they hold in store is powerless to employ with real advantage more than the smallest fractional part of their great wealth. This wealth is like the energy potential in the coal deep buried in the earth, which must be mined with great toil, and burned to advantage, to convert it into impelling force and operating energy. Great fortunes, wisely employed, may render incalculable service to mankind, but it is an idle dream to suppose that dollars are directly convertible into brains, and that great gifts to education necessarily produce results proportional to their extent. Education, which is mental culture and implies a training of the faculties and development of the senses, is not on tap to be obtained by the turning of a faucet. When I survey the bewilderingly complex curriculums presented in the announcements of some of our universities I am reminded of the elaborate *menu* which is placed before the guest at a great hostelry. Everything is offered and one may choose this, and reject that, as his desires are simple or his greed consuming, but only that which is digested and assimilated serves the purposes of food and becomes a part of the body. Physical gain is not to be measured by the extent of the repast, nor is intellectual gain to be estimated by courses pursued, hours spent, experiments performed, books read, or even examinations passed. To hold otherwise is to entertain a very material conception and place too high an estimate on the value of the mechanical and material, the objective and external things which may be used to train and develop, but which can not create,

the subjective faculties which are the real entities because they are the springs of action.

Let us look at this matter a little more closely, observing at the outset that for the carrying on of original investigation in most departments of science, and more especially in the physical sciences, money, and much of it, may be required. But I am not considering the needs of the investigator, nor the cost of carrying on his work, which may be great, ought to be met, and generally is, in one way or another, provided for. I have more particularly in mind the needs of institutions like our own, in which the work is mainly educational, not creative, and in which pupils are seeking to acquire some small part of the sum total of the world's accumulated and classified knowledge. Such pupils form the vast majority of those who attend our common schools and academies, our colleges and so-called universities, and our technical and professional schools as well. The average teacher in these institutions is himself not a genius, for the world's supply of such would scarce suffice to fill the places, but if he be competent and conscientious he is fulfilling a true mission, and the great work of education is carried on by teachers of this class. If he be deficient in those qualities which enable the born teacher to uplift his pupils, develop latent capacities, stimulate lagging energies, and broaden their mental outlook, so much the worse for him and his pupils, but his work is not to be condemned because much of it is but the repetition to successive classes of the rudiments of knowledge. He is dealing with the average intellect and with ordinary needs, and his work may be humble but it is not contemptible. It is honorable and all-important, and lies at the very root of our civilization and the intellectual progress of the race. Geniuses are born, not made. They soon outrun their instructors, and have indeed little need of them, being generally their own best teachers and the teachers of others. No complex apparatus, nor educational system, can create or even do much to develop them, and the chief function of the teacher, and main aim of education, must ever be to classify, preserve, render available and transmit the world's knowledge to the largest number of people who will receive it.

Now to carry on much of this work of education extraordinary facilities are not necessarily required. Ordinary results are secured by the employment of ordinary means. Unless we establish a standard of ideal and absolute excellence and perfection, and demand that the teacher shall conform to such standard or cease his teaching, we must needs be patient and tolerant of present, though imperfect, conditions. To abolish schools whatever their grade, because the teaching force is not of the highest, the equipment not of the best, and the results obtained not entirely satisfactory, would be folly indeed. And yet this is essentially what some idealists would seem to advise. What shall be thought, for instance, of the sanity of a critic who has said at a conference of state medical examining boards recently held in Chicago, that of the one hundred and fifty medical schools in this country only six were what they ought to be. We may well inquire of this critical essayist—whose opinion as to what medical schools "ought to be" is to be taken? Are we to assume that the school with which the critic is connected is one of the six that are what they "ought to be"? If so, does it represent perfection? The absurdity of such utterances is the more clearly seen when we consider how far short of perfection are the results of all human endeavor. Churches, social organizations and philanthropies, legislative

bodies, courts and political parties are not what they "ought to be," but are they to be indiscriminately condemned, and are we to be told that we should be better off without them! Aside from an abstract sense in which it may be said that only pure truth and absolute perfection are admirable, and all error, incompleteness and insufficiency is abhorrent, it can not be maintained that the existing machinery employed by men collectively in society serves no good purpose because of its imperfections. Such a view underlies much anarchistic philosophy, discourages the endeavor of those who are laboring to better existing conditions, and retards progress. In the discussion of educational problems the inferences and strictures of irrational critics are unproductive of good result, harmful in many ways, and their recommendations if carried into effect would work irreparable injury to our educational system.

In the sphere of education we have been, it seems to me, unduly impressed by mere size and extent of output. Having observed the advantages that in the industrial world accrue from combination and the annihilation of competition, and learned that profit depends upon increased output, diminished cost of production and control of the market, it has seemed to some fair to assume that the larger schools should be able to afford better educational facilities, and these at a lower cost, than the smaller ones, and that these therefore ought to be strengthened since they would seem to be destined in time to extinguish their weaker and less favored competitors. We are often told that the small college will have to go, and so convincing appear many of the arguments of those who hold this view that it is not surprising that they find ready acceptance among philanthropic millionaires who are seeking for channels into which they may turn some of their surplus wealth. But what are in reality the results of this concentration which produces in some cases a kind of monopoly, and what may we expect them to be in the future, are questions well worth raising. This rather startling fact I think is one of them, that our richest and most liberally endowed colleges and universities are the most expensive to the student, and that in proportion to their gain in wealth the cost of attendance upon them increases. In other words, large capital, extensive plants and increasing patronage do not seem to reduce the cost of the educational output. This is not in accordance with economic laws as we observe their operation in the industrial world, but the fact is one not difficult to explain. Increased attendance means larger buildings, with more lecture rooms and laboratories, and a larger teaching force, and the cost of providing these may greatly exceed the increased revenue from tuition fees, so that large patronage by no means implies diminished cost of maintenance *per capita*, but often the reverse, and for this reason some of our colleges are now seriously considering the advisability of limiting the size of the entering classes either arbitrarily or by raising their entrance requirements. Nor can it be said that the larger institutions give so much better a return that the greater cost to the student is simply proportional to its real value. This view might be urged with some show of reason, for while it is a simple matter to determine the value of the material output of a manufacturing concern it is by no means easy to estimate moral and intellectual values. All sorts of arguments might be advanced as to better teachers because of better salaries, and better teaching because of better equipment. I do not propose to debate the question, but I hardly suppose that any one would claim

that there is any definite relation between the size or wealth of an educational institution and its real effectiveness, so that it might be said for example in the case of an institution having a million dollars invested in its plant and another million in endowments, that, if these were doubled the institution would be capable of doing doubly efficient work. I take it that no reasonable person would undertake to maintain such a proposition as this, and yet some such notion seems to be entertained by some people who are unreasonably impressed by large figures and discover a relation between bigness and excellence that is invisible to more judicious observers. If the money given to education was in all cases as wisely employed as that which has been applied to the establishment of free technical and trade schools, for example, it is doubtless true that greater and more beneficent results might be accomplished, but when much of it goes into unendowed and often unequipped buildings which can only be maintained by calling upon alumni and friends for aid, or by raising tuition and other fees, we can understand why many colleges are property poor and constantly begging. The building of great dormitories often makes sharper the lines of social cleavage in the student body, places a premium on wealth, encourages luxury and ostentation, and makes life the harder for the poor and self-respecting student, and money expended for building gorgeous chapels, great gymnasiums, magnificent dining-halls and the like is generally misapplied and productive of few good results. Even great library buildings and museums are often useless duplications, the maintaining of which makes large drafts upon income, and they may be of little direct benefit to the undergraduate student, and none at all to the advanced worker for whose needs they may be quite insufficient. These external and material things, often imposing, even magnificent in themselves, contribute little in any direct way to the legitimate educational work of an institution, and they often limit its activities and interfere with its real usefulness. Theirs is a fictitious value, largely sentimental, but the cost of maintaining them is great, and in this do we find further explanation of the fact that our largest and richest educational institutions are most expensive to their patrons. Nor can much satisfaction be obtained from a consideration of the claim that in many of our larger colleges opportunities in the way of scholarships are open to able and deserving students, because it is not so much the poor man of brilliant parts, able to secure these prizes, that needs aid and encouragement, as the man who is both poor and of average ability. He it is who most needs aid and for him more should be done. There is danger that the conditions in some of our endowed eastern universities may in the not far distant future come to resemble those existing at Oxford and Cambridge. Bishop Gore in the House of Lords has recently denied that these universities are training the "governing classes." "The working classes," he asserts, "are beginning to govern the kingdom, and they are excluded from universities which are playgrounds for the sons of the wealthy, the majority of them idlers." The influx of foreign students at Oxford, due to the establishment of the Rhodes scholarships, has shown the insufficiency of much of its machinery for latter-day needs, and in America we shall be losers and not gainers if through mistaken sentiment we copy the imperfections of English universities instead of aiming to develop a type natural to our soil, adapted to our needs and in keeping with our institutions and social system. Chancellor MacCracken, in an

address to teachers and students of the summer school of the New York University last month, said:

> More than one university to-day is in great danger of being misunderstood. A few "trust magnates" are giving to certain universities millions of dollars. These universities are in danger of being reckoned the purchased servants of a narrow caste. The sure and efficient way to escape this suspicion is for the universities to rid themselves of idle undergraduates who make no end of trouble, and to devote their money and energy to giving instruction and inspiration to the public teachers throughout the land. In a word, let the university cease to serve so largely the unproductive few and rather serve the productive and industrious many.

In referring as I have to the misuse of moneys given to education, and in the few words that I shall add in taking leave of this topic, it has been far from my intention to imply that money is not needed in educational work. It is, and vastly more than has yet been given, or provided by any state, might be well applied, but my desire has been to emphasize the fact that large real estate holdings, costly buildings and even great collections in science, literature and art, are merely external things which may, or may not be, advantageously and economically employed, and should be regarded as means and not as ends in themselves, since they may be entirely unproductive unless wisely used, and even their possession may, by establishing false standards, restricting competition and in other ways, work harm rather than good. In a country like ours higher education should be in no way dependent upon the variable and perhaps ill-directed impulses of individuals, however generous and philanthropic they may be, but like our public school system, which is our pride and great privilege, makes valuable to us our political rights, and is the chief conservator of our national well-being, it should be, and doubtless in time will be, administered by the state for all the people. Following the lead of western states, we shall have great universities, of wider scope and greater size than any now existing, where instruction in all departments of learning will be given to all who are competent to avail themselves of the advantages offered and are desirous of embracing them. Can public funds be better expended than in the education of the people, and if the revenue of the state was largely increased by proper taxation as of incomes, increased graduated inheritance taxes, and larger taxes upon stock-transfers, public franchises and many luxuries, the cost of higher education for the people would not be felt. I shall not stop to answer the objections of those who entertain the time-dishonored notion that public education is a form of charity, and that it is no part of the duty of the state to bring higher education to the masses, since the principle, well enunciated by the late President Harper at one of our university convocations in this city not many years since, that a municipality has right to teach anything in its schools that its voters are willing to tax themselves to pay for, is seldom any longer denied. At its last session the Wisconsin legislature passed a law authorizing cities in that state to raise funds by tax for the establishment of trade schools, and similar and even more comprehensive action bids fair soon to be taken in other states. If the east does not follow the west in establishing, and liberally maintaining, state universities we have reason to fear that our smaller colleges and professional schools will be overshadowed and ultimately extinguished by the larger institutions which receive the great benefactions. Professor Lowell, of Harvard, in an address delivered at Yale last April, shows that "a young man can go to-day more cheaply to a state university in another state that charges a differential fee,

than to one of the eastern colleges.'' If the cost of attending our private and endowed institutions is to go on increasing the result inevitably will be that the larger and richer these become the more inaccessible will they be to the poor student who has greatest need of such advantages as they offer. I return to and emphasize this point because it is not a theoretical criticism, but an obvious fact. Our smaller colleges deserve and should receive fuller recognition and better support. Unless this is accorded them they are sure to suffer and the people to be the losers, but the ills resulting from the increasing cost of higher education may doubtless best be relieved by the state and in the manner indicated. The old objection to all this that we have doctors and lawyers enough but need more working people and servants, has been answered too often to need notice now. The law of supply and demand will take care of all that and, in any event, no social order can be lasting which seeks to perpetuate itself by keeping a part of the people down.

But another reason aside from general expediency why the state should undertake the duty of providing technical and higher education for the people may conveniently be stated now. During recent years the state has assumed the right to regulate many industries and most of the professions in the public interest. In so doing it has incurred consequent responsibilities. Industrial independence is now held in check by state control, and at no time has the disposition to regulate trades and control corporations been so marked as at the present. And so with the professions also. The regulation of the practise of medicine amounts in most states to absolute control. The state sets the educational standard for the student entering the medical school, and it fixes the length and character of the course which he must pursue, and after his graduation requires him to give evidence of his competency by passing an examination before it confers upon him by license the right to practise medicine. Infractions or evasions of the medical laws are punishable by severe penalties and the control exercised by the state over the practitioner of medicine from the day of his entering into the ranks as a student is supreme. But, in raising the standard and regulating the practise of medicine the state has assumed new responsibilities and the time is not far distant when it will be recognized as its obvious duty to make adequate provision for the education of its people, not in medicine alone, but in all the professions and many other occupations which it regulates, or in which it has established standards. This need in no way interfere with private institutions any more than our public schools interfere with private academies at present. If the result of the establishment by the state of high standards in medicine, for instance, is to increase the cost of medical education so that the doors of the schools must be closed to many, then the duty of the state to make provision for the education of such is apparent. And this condition is approaching. That many schools of good standing and entire respectability continue to carry on their work, as in the past, through the income derived chiefly from tuition fees is true, but it will be found upon investigation that these schools are possessed of certain advantages, as of position, established reputation, or exemption from certain present restrictions, which account for their continued existence. We are told by some educational experts that it should cost the medical school three or four times as much to educate a student as it can reasonably demand from him in fees. In other words it amounts to this—that no body of

men having secured a charter in this state, for example, could provide the money to erect and equip a medical school which should comply with the requirements of law, and carry on therein the work of medical education at a profit. Indeed a very large balance on the wrong side of the ledger must soon be shown if running expenses and interest on cost of plant is to be paid, and the school is to compete with other established schools. If this be true it must be evident that ordinary business enterprise can not be depended upon to establish and maintain medical schools, and that the work of medical education must sooner or later be done either by private institutions enriched by wealthy benefactors, or in universities established and maintained by the state. We are in a period of rapid change. For a time the old order will suffice, but it can not be for long. Some of us view these impending changes with anxious uncertainty; others with apathetic indifference, and others still see in the progressive movement that is taking place the promise of the satisfactory solution of a perplexing problem. For myself I can not for a moment doubt that when the time comes for the people to decide whether the avenues that lead to professions like ours are to be kept open and safe-guarded to all the people, or whether they are to be narrowed by private control, or maintained by the self-sacrifice or generosity of individuals, they will speak with no uncertain voice.

And now before we take leave of this subject may I indicate some present tendencies which to my thinking need to be restrained, and which if not checked may result in the evolution of such a cumbersome and mechanical system of medical education and licensure as may threaten its overthrow, and in what I shall say, as also in all that has been said, excepting only in the words of welcome with which as a representative of the faculty I have greeted you, I give expression to individual opinions and am not speaking for my associates, so that if there be error or fault in anything said the blame is mine alone and should be imputed in no degree to any other. It behooves us, I think, to remember that our licensing boards are creatures of the state and that our whole educational system is subject to the will of the people and is not controlled by educators, specialists and salaried officials. Those who favor reasonable state control will therefore not urge reform of too radical a nature lest what has been gained be placed in jeopardy. In the state of Minnesota last winter so insistent a demand was made in the legislature for the opening of the state university to all applicants without regard to preliminary training that the project, though subversive and ill-advised, had to be considered and a compromise effected. Conditions in the east are different, but if the policy of certain extremists, who are influential at present in our state and national associations, is adopted, opposition will be aroused which may precipitate a reaction. Those who favor higher standards and extreme state control base many of their arguments upon doubtful premises. I am sometimes inclined, for example, to disagree with those who hold that since the adoption of a preliminary education requirement by law in this state an improvement has been effected in the class of men entering the medical schools. Men who spell wretchedly and make bad work with simple arithmetical calculations still enter, armed with state credentials, and last year in this school more first-year men were conditioned than in any previous year within my recollection. Nor am I inclined to believe that the average reputable American physician to-day is in any recognizable de-

gree superior to his predecessor of a quarter century ago *as a result* of state supervision. State control may eliminate ignoramuses and charlatans, although in many states the laws are so framed as to apply to physicians of established schools of practise while irregulars of many kinds and "healers" are exempted from their provisions, but however effectual they may be as restrictive measures laws are much less effective in elevating the people in any direction than many enthusiasts would have us believe. The educational systems in European countries where bureaucratic methods prevail do not always produce the most enlightened citizenship, and in a democracy institutions thrive best if the people are not governed too much. I think that our medical schools themselves may be trusted in greater measure to bring about needed reforms and advance medical interests than some noisy reformers who clamor for more and more stringent laws seem to suppose. It seems to me to be time that the medical profession asserted its dignity once more and resented the imputation that so large a number of its members are incompetent or unworthy that the public needs further protection by special legislation. Whatever others may think I shall not hesitate to raise my voice in opposition to such utterances as the following. Says the *Journal of the American Medical Association* in its issue of September 14, in the leading editorial:

> Stronger safeguards should be placed about admission to medical practise in many of the states. The examining boards should be given supervision of all medical colleges within their respective states, with authority to pass on the entrance requirements of prospective medical students and to issue or to have issued to medical students entrance certificates. They should have the right to inspect the medical colleges and to close such as are not sufficiently equipped or are not doing satisfactory work. . . . Without this right the boards are not in position to protect the public from incompetent physicians.

And this is the utterance of a journal which is supposed to represent the profession of the United States, but which, under its present management, is, in the opinion of some, representative of commercialism in medicine in a preeminent degree. It floods the mails with circulars urging graduates of the schools against whom it brings this general charge of incompetency to ally themselves with the association and to subscribe for the journal, and it solicits the advertisements of the colleges with unwearying persistence. In the issue in which this editorial appears I find the advertisements of no less than ten medical schools which, according to its own statistical tables published in its issue of May 25, ranked in the lowest class as judged by the percentage of failures of their graduates before state examining boards during the year 1906. Now I do not hesitate to say that in my opinion there is not an examining board in any state in the union which could safely be invested with such authority as the *Journal* recommends. In our own state, for example, this board is so constituted that although eighty-five per cent. of the physicians in the state are "regulars" they are represented by but four members upon a board of nine. In many of our states men of only average ability and capacity are drawing salaries and exercising a little brief authority under the laws in places often secured through political influence. What shall be thought of a proposal to place the medical schools of this country under their absolute control. We have been shamefaced too long, fearing perhaps that if we in the schools raised our voices in protest against these insistent demands it might be thought that we feared investigation or opposed reasonable and proper supervision. Such is not the fact, but silence may be construed at times into an admission of

guilt and it is high time that we resented the implication that the medical schools of this country are, as a class, unmindful of their high responsibilities and are employing questionable methods in the conduct of their work. There are poor medical schools as there are poor schools of all kinds, but no general charge of incompetency or dishonesty can lie against them as a class, and we should no longer remain silent when such charges are either directly or impliedly made.

Now first of all it seems to me we must guard against anything that savors of trades-unionism in medicine. Physicians should be banded together that they may promote the interests of their profession in proper ways, but any action that looks like closing the doors, or putting up the bars, for the purpose of lessening the number of medical men, and restricting competition, ought not to be tolerated. We are often told that the number of physicians in the United States is out of all proportion to the population and greatly exceeds that in any other country, but this fact in itself has no particular significance and may be cause for thankfulness. Conditions are different. If these practitioners are competent, and can make a living, let us not complain but rather thank God that the American people are better supplied in this respect, as in so many others, than those of Russia, or even France, Germany or England. With those who start with the assumption that our social system needs to be conformed to the European or monarchical type I have no argument, but there is danger that well-disposed and entirely patriotic persons, who are possessed with a zeal for reform and advance which is not tempered by a wise discretion, will by much fussing and compiling of statistics and the everlasting iteration of certain ideas bring about changes which will not be betterments. Such are the people who would reduce everything to a strict numerical expression. They pursue their investigations with a foot-rule and hour-glass, place implicit faith in statistics, and would reduce all to a system. They would determine the competency of a student to enter upon the study of medicine by the special courses he has taken, and the hours devoted to each, and whether his work is to be counted or not is to be decided by a measurement of floor-spaces of the recitation rooms and laboratories in which he has been instructed, and the cash value of the apparatus employed. They would measure his subsequent progress by mathematical computations in which the factors are forty or fifty divisions of the medical curriculum, each subdivided into lectures, recitations, clinics, demonstrations and laboratory work, and the value of each determined by a laborious conversion of these into hours, which must be so apportioned as to preserve a certain ratio, and the sum total of which must not fall below a prescribed minimum. And whether this instruction which he has received has been good or bad is to be determined by a consideration of the population of the place in which the medical school is situated, the value of buildings and apparatus, the ratio of students to floor areas, the number of cases treated in affiliated hospitals and dispensaries, and other such data. This is not fanciful. No month goes by that we are not requested to supply such information as this to individuals who are preparing papers to read at society meetings and conferences, to committees and councils of societies, and to state examining and licensing boards. These tiresome statisticians, with their arbitrary standards and mathematical deductions, seem to be in the ascendancy at present, but their enthusiasm needs to be restrained and saner views will

ultimately prevail. Their information is often inexact because it is voluntarily and often carelessly given; their methods of computation are faulty, and their conclusions therefore unreliable. Their method takes no account of the past record and acknowledged reputation of institutions, of the experience, devotion and ability of teachers, and other elements the value of which is not determinable by the quantitative methods in which they so much delight, and in the case of the student it has no way of measuring natural aptitude, quickness of perception and the zeal which is often born of necessity. For myself I do not believe that either institutions or individuals can be measured up in this mechanical manner, and I do not think that such methods will be tolerated if they ever come to be rigorously applied in determining the standing of colleges and passing upon their credentials. It is not denied that great differences exist in the quality of the work done in the medical schools of this country, but I am clearly of opinion that the present tendency is to attach altogether too much importance to the institutions in which a man's education has been obtained. Do we not need to change our thinking in many respects? Institutions do not make men. They only aid a little in their development and the things which we have taught ourselves are the most valuable to us in the real work of life. "They do most by books," says Sir Thomas Browne in his "Christian Morals," "who could do much without them, and he that chiefly owes himself unto himself is the substantial man," and Darwin has said with greater deliberation and more seriously, and I beg you well to weigh his carefully chosen words, "I am inclined to agree with Francis Galton in believing that education and environment produce only a small effect on the mind of any one and that most of our qualities are innate." Manners are the result of, and much of our behavior is influenced by, education and environment, but our qualities are born in us and training has little effect upon the mind. Hence the mistake in attaching too much importance to time spent, and courses pursued, in institutions, and there is great danger that our laws regulating the practise of medicine and other callings may be patterned after too narrow, inelastic and mechanical a model and serve to restrain rather than encourage the development of the vocations they control.

Another tendency needing restraint is exhibited by certain specialists and faddists who urge upon colleges the necessity for giving instruction in all sorts of special subjects more or less closely related to medicine. Lest I give offense to some of these enthusiastic propagandists who push their projects with energy worthy of more important causes, I will make no catalogue of them. These zealous advocates read papers at society meetings; interrogate the colleges in tones implying that they are guilty of wilful neglect in failing to include their fondly cherished fads in their curriculums; and they organize societies and write books on their specialties. Unfortunately they take no account of the demands now made upon medical students and the relatively small importance of their particular branches, and they overlook the fact that such subjects as they would have taught in systematic courses are either already included in other departments, or else are of such a nature that the physician who has need of special knowledge concerning them can easily secure it for himself when the want is felt. Unless the colleges resist this kind of pressure from without that is brought to bear upon them either their courses must be

lengthened or essential subjects must be curtailed.

We may indeed go further than this and say that the disposition to add anything to the present medical course which will necessitate lengthening it is a tendency that needs to be restrained. Unless the schools are to adopt an impracticable standard for which certain idealists seem to be contending, we may well be satisfied with the present four-year course. No one can deny the great advances which have been made within recent years, but is it not idle to suppose that educational courses can ever be made theoretically perfect and complete? Let us abandon the notion that the whole field should be covered in the medical course, and recognize the fact that as knowledge advances, and specialization increases, the ability of the individual to master the whole diminishes, so that the first and evident duty of the medical school should be to teach essential fundamentals and well-established principles, and leave many specialties, and most of the subjects which are still debatable, to be treated in optional courses or in other institutions.

And to my thinking it is no less true that the time spent in preparatory work is often much too long. The favored pupil who leaves the high school or academy at eighteen, college at twenty-two, and the medical school at twenty-six, if he takes a year or two of hospital or other post-graduate work, or studies abroad, will hardly be able to begin his practise until he is approaching thirty. This is quite too long a preparation. The man who has nothing to do, and plenty to do it with, may spend his time thus if he so chooses and no one be the worse perhaps, but the average man can not afford it, few men need it, and many men are injured by it. Doubtless some men mature less rapidly than others and need to be kept under tutors and guardians longer, but no educational system should be planned to meet the needs of the weaklings or the demands of idlers. Montaigne in his essay on "Age" says:

> I esteem that our souls show at twenty years of age what they mean to be. No soul that has not by that time given evidence of its strength will give proof of it afterwards. The qualities and natural virtues produce in that time or never what they have of vigor and beauty. It is possible that with those who occupy their time well science and experience may increase with life, but vivacity, promptitude and firmness, and other more important essential faculties, will fade and deteriorate. Therefore I complain of our laws; not that they leave us too long to our work, but that they do not employ us earlier; for considering the frailty of our life and the many ordinary accidents to which it is exposed I complain that so large a portion should be given up to childhood, to idleness and to apprenticeship.

If that was sound doctrine in the sixteenth century it is even sounder in the twentieth and needs restatement. Too much time is wasted in preparatory schools and colleges, but if these things can not be remedied then, to my thinking, the prospective medical student will do well to go from the high school directly to the medical college, or spend at the most not more than two years in intermediate work, which he may well devote chiefly to physics, chemistry, biology and modern languages. The old-fashioned college course is of little service to the student of medicine, and the time spent in pursuing it is frequently worse than wasted. The habits and associations which are formed are too often distinctly detrimental, and that four of the most valuable years in a man's life should be given over, as often they are, to aimless study, boyish frivolity and the formation of ideals which must be abandoned, and of habits which must be corrected in after life, is indeed deplorable. The youth who at eighteen or nineteen is without plans for the future and is carried along by in-

dulgent parents through a four-year course in college is little likely to be the better for it. If young men are to be sent to educational institutions for the purpose of increasing their social connections, winning laurels in athletics, touring the country in glee-clubs, or acquiring a superficial polish often referred to as culture, let the fact be admitted, but let us cease calling the experience thus obtained education. That a man should be at pains to learn much that later he ought to forget if he have due regard to his soul's health is disheartening indeed, but too often true of those who, without real disposition to learn, are yet engaged ostensibly in study.

But we must leave these general considerations and in so doing let me say that my object in discussing with you some of these educational problems has been neither to prejudice your minds nor to urge upon you the acceptance of my own views, but rather to incite you to investigate for yourselves and form your own conclusions. Do not accept standards and entertain opinions simply because they seem to be held by those about you. All real reforms have been brought about by discontented people —not by the conservatives and self-satisfied people, but by the radicals who go to the root of matters and do not judge by the stalk or even the flower alone. In every community a certain number of prominent people desire, from motives of self-interest, to maintain unchanged the present order, but the larger part are inert and take their opinions ready-made from others. These would not willingly injure their fellow-men but they are satisfied to drift with the current, and feel it to be no part of their duty to inquire whether the multitude are as fortunate and as well rewarded as themselves. Better far is it for us and for others if we think for ourselves, give expression to honest convictions, unrestrained by considerations of policy or temporary expediency, and when called upon to act, do so with the courage and decision which real convictions should impart.

And now will you allow me to add some words of advice and general counsel more particularly addressed to those who to-day make formal beginning of their medical study. You are entering, gentlemen, by different paths the portals which give you access to a noble profession. Do you recognize your responsibilities? If so the realization of them must of necessity affect your behavior and influence your lives. You are no longer boys, but men, associates and coworkers with your instructors, many of whom perhaps some of you will outrun in the race. Time will tell. See that you start aright. Do not think that your course is divided up into periods, some of which are preparatory or probationary, and admit of idleness and dissipation. You could not make a greater mistake, for it is not so. You are in the profession now. Claim all things to which you are entitled and act as befits men who have adopted a high calling. I beg you to listen to me when I say that you can make no greater mistake at the outset in your course than to attempt to inject into the medical school any of the boyish frivolities or foolish customs that obtain and may even be encouraged in high schools and colleges. Put all such things behind you, for they have no place here. If you have not "been to college" do not, I beg of you, suppose that the medical school in some way is to supply an imaginary lack. Don't call yourself a "freshman." We have no "freshmen" here. Don't do the foolish things that many college students do because you are in a "college." Many of these things are bad enough even in the places where usage has in a sense sanctioned them, but they are entirely out of place in a professional

school, and actions which might be condoned on a college campus become, if transferred to a medical school, merely disorderly acts, the perpetrators of which render themselves not only nuisances but liable to arrest for breach of the peace. I can not put this matter too strongly, and yet I do not wish to lay down any particular rules to govern your future conduct here. The whole matter lies in a nutshell. You are men, and have come here to associate yourselves with men engaged in the pursuit of knowledge whose desire it is to assist you in your work. They assume that your habits are fairly well formed, and that you are competent to enter upon the work which you have undertaken. They are willing to counsel and aid you, as friend may aid friend, but they do not desire to take the place of parent or guardian, and do not think that they should be held in any way responsible for your deportment. They stand upon no exalted pedestals and are neither omniscient nor oracular in their deliverances, and they expect from you only the courtesy which they are ready to render to you. That you are medical students then imposes new responsibilities and confers new dignities, but gives no license to disregard the ordinary rules of behavior which need no formal statement among gentlemen. Should there be any one here who has not appreciated this fact before and who is beginning his course under a misapprehension I beg him to revise his thinking that he may see things in their right relations to-day. The medical school is no place for boys and boyishness, and the medical student of to-day should no more conform to the Bob Sawyer type than our trained nurses do to those of the Sarah Gamp pattern.

Now this does not mean that there should be no relaxation at proper times, nor that all manifestations of class feeling and college spirit are necessarily out of place. Men who are closely associated for considerable periods of time naturally form attachments and such association engenders a kind of *esprit de corps,* but among men this should not find expression in boyish acts, and when it is manifested in buffoonery, lawlessness and physical conflicts the perpetrators of such acts become troublesome and disturbing elements. Our colleges are responsible for much of this lawlessness, for they too frequently condone where they should condemn, and they have been slow to reprove much which they might well have repressed, but from the man who has entered the professional school better things are expected, and if he falls short in his behavior he will find no indulgent apologists to hold him blameless.

Now, it may not seem very gracious in me to take advantage of the opportunity which this occasion presents to utter either warnings or complaints in seeming advance of any need of them, but the sincerity of the interest which I feel in your welfare prompts me to this frank speaking. Too many men who began their course with us last year made utter failure and find themselves again at the starting point, and for this reason, I believe, that they entirely misunderstood their position here. If I can save any one man from such lamentable failure I shall feel well satisfied to have put plain speaking in place of pleasant phrases and meaningless generalities. I can hardly suppose any one of you to be so short-sighted, but if any one is here to please parents or friends, to pass the time, or to secure an ornamental degree, he will find himself out of his element in such a school as this. Assuming, however, that you are here with good reason and honest purpose, what can be more evident than that you should cooperate with your teachers in all ways that you may secure to yourselves the

largest possible return for the time and the money which you are investing. If you slight your work, evade or seek to be excused from it, is it not evident that you are injuring only yourself? This would seem to be the merest commonplace, but it is far from being recognized by all. Men come here from schools and colleges, and they do not always realize that inherent conditions are different. In the college course the man whose only ambition is to get through and secure a degree can save himself trouble by selecting easy subjects where he has choice, by slighting his work to the point of maintaining a bare passing stand, or by dint of cramming, cribbing and faking he may secure his ends and, in a sense, get the better of his instructors. But in a medical school it is not so. There are, and can be, no equivalents and electives, no purely disciplinary or culture studies, and there should be no superfluities. Every subject is connected with some other and all are essential. Perfection is not expected, and it is not denied that some matters may be sacrificed or slighted and one's standing maintained, but none the less it is true that just in so far as work is neglected the delinquent is a loser, and if any one is cheated he is the sufferer.

Another thing I think ought to be said. You will find the work here harder probably than any you have done before. You will need to devote to it more hours a day than you have ever probably given to study in any other institution. Some advisers would therefore caution you as to the care of your health and the dangers resulting from a too strenuous application, but these are more imaginary than real, and I shall give you no such caution. I have known many men injured by too much exercise and harmed by too much recreation, but I can recall no instance, in my own personal experience, of injury resulting from too much study. I do not deny the possibility, but I consider the probability so remote that words of caution are uncalled for. Such exercise as you need you can secure in simple and inexpensive ways. Leave out-door sports for the present to those who have leisure for such diversions, for you have other things to do and will have little time to give to them. School teachers, clergymen, studiously disposed persons generally, who lead sedentary lives, ordinarily enjoy the best health, and the risks and dangers to which the medical man is exposed do not result from over-study or too close confinement, and even if they did, remember that the mere preservation of health and prolongation of life are not the highest conceivable aims, and that these considerations may be, and often are, disregarded with advantage. Intellectual growth and spiritual supremacy are more important than muscular development and physical superiority, and while the sound mind in the sound body may be the ideal toward which we should strive, if either must suffer let it not be the mind.

Gentlemen, you are prosecuting your medical studies at a propitious and in a momentous time. The science of medicine is making great, and is probably destined to make still greater, advances. The place you have chosen for your study is favorably situated and Albany is doing her part in the advance movement, to the progress of which you may have opportunity to contribute. Its importance and influence as a medical center is daily increasing. Its hospitals are of the best, its laboratories well manned and productive, and this old school is entirely in sympathy with the modern trend in the development of the medical sciences, and is employing modern methods in its work of teaching. Its graduates rank high in the profession, and occupy important and conspicuous places in the

community. A high standard has here been established and it will be maintained. What more need I say than that we welcome you to our ranks, pledge you our aid and urge you to improve every opportunity offered you for gaining knowledge of the profession to which you have devoted your lives. May this day be an auspicious one to you all, full of encouragement to those who return after a season of rest to the prosecution of their studies, and presaging success to those who, with honest purpose and entire devotion claim entrance to the ranks. On behalf of the faculty I greet you once again and bid you cordial welcome to this place.

WILLIS G. TUCKER
ALBANY MEDICAL COLLEGE

AMERICAN CHEMICAL RESEARCH[1]

IT is no disparagement to say that there are few chemists whose research work, at any given time, is of vivid interest to all classes of their chemical colleagues. To address an assembly of this kind on the experimental results of another man, to which results one has nothing of one's own to contribute, is to lay oneself open to a cross-fire—one part of the audience will ask why the speaker did not select a subject of which he had an adequate knowledge, whereas the other part will enquire why he did not deal with something that was *really* interesting. I have protected myself against both lines of attack by choosing a very large topic. I am confident that, intrinsically, it is interesting to each of us, because we all read our own papers and occasionally the publications of our friends, especially if we believe them to be erroneous, or think that they are going to interfere with our particular results!

During the past three years I have had the sole active charge of the *American Chemical Journal,* and I propose to take its history as the basis of my remarks. I select it simply because of my familiarity with it; the subject could be equally well illustrated by our own *Journal* and, so far as its age permits, by the *Journal of Physical Chemistry.* The first number of the *American Chemical Journal* is dated April, 1879. Volume 1 (1879–80) contains 460 pages. Volumes 10 and 20 (1898) comprise 472 and 890 pages, respectively. After that year two volumes were issued annually, the last one, number 37 (January to June, 1907), includes about 650 pages. To put it in another way, at the end of ten years the quantity of published matter per annum was the same as at the end of the first year; at the end of the twentieth year it had doubled, and eight years later it was three times greater than during the tenth year. An inspection of the earlier volumes suggests many reflections concerning the almost complete change which has taken place in the names of contributors during the past twenty-eight years. I shall not indulge in these beyond saying that death accounts for only a few of them. I feel sure, however, that you would not wish me to pass in silence over the fact that of the earlier contributors, practically only three, Professors Arthur Michael, H. N. Morse and W. A. Noyes, continue to contribute, at the present time, as successfully and copiously as ever to the extension of scientific knowledge.

Returning now to the consideration of the enormous increase of published matter, especially during the past fifteen years, the question arises, To what is it due? Undoubtedly the amount of scientific research carried out in this country is greater, both relatively and absolutely, and a comparison of the papers published in American chemical journals with those appearing

[1] Address delivered before the American Chemical Society at the Toronto meeting, June 28, 1907.