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Jacob Come Scientific Building.

ADDRESS BY

Prof. Charles F. Nimes.



ADDRESS

—BY—

Prof. CHARLES F. MIMES, Ph.D.,

at the opening of the

Jacob Tome Scientific Building,

DICKINSON COLLEGE,

CARLISLE, PA.,

JUNE 24th, 1885.

M. E. BOOK ROOM PRINT,
HARRISBURG, PA.
1885.

THIS would seem to many to be a time and an opportunity to inflict upon a patient audience a long and ponderous address. There are many topics that would tempt to such a course, but I will forbear from what might be expected, and briefly touch upon a few points that seem to justify notice at this time.

We stand to-day at the transition from the old to the new.— Behind us more than a century of achievement, before us the grander possibilities of the unlimited future; not separated from each other by the imaginary line of a closing century, but by what is more substantial and easily recognized, a beautiful building with broad and deep foundations.

Sentiment would incline us to a retrospect, to trace the history of scientific instruction in Old Dickinson from its foundation, so creditable in all its aspects, through its century of mutations and expansions of its course of study, its eminent instructors, its honored alumni. But this I feel would be a mistake. This new building faces the great advancing and expanding future, not the historic past. It presents promises, not achievements. It invites to the consideration of questions, not as to what has been, but as to what will be, and perhaps not without anxiety on the part of some. What, then, does this building and this occasion mean? How is this building to be utilized? What anticipations of benefit to the college may rea-

sonably be formed from its presence? Does it mean radical innovations, wide departure from old established courses of collegiate study? Does it mean university expansion, accompanied perhaps by feebleness as a college? We trust not. We would like to interpret it as meaning *multum* rather than *multa*. We would hope that, whatever else it may *grow* to mean, first of all it may mean increased strength to the college as a college, increased completeness in facilities for instruction in science within college lines, rendering possible a thoroughness in instruction second to that of no other college in the land, not even the oldest or proudest, whether titled as a college or university. This need not necessarily mean more science in the course, or wider election; but it should mean, that in as far as science can be utilized as an educational means it will be utilized; that instruction in it, as far as carried, shall be made as rational and thorough as it can be made; that no time or labor of student or instructor shall be frittered away and lost by reason of defective facilities. Upon this point I may be allowed to speak with the earnestness of convictions, deepened by twenty years of effort, which knew no leisure, to bring scientific instruction in this institution up to a high ideal. Day by day, year after year has it been necessary by personal labor and sacrifice to supplement limited provision for educational demands. If a measure of success has attended these efforts, much of it must be ascribed to the uncomplaining, earnest application of students, under great inconveniences, and even discomforts. But to me there was always the discouragement arising from a knowledge of time and labor wasted, of mental energy dissipated in useless operations. To-day we trust experiences such as these are with the past.— Were it not so, we might not leave without some regret a building, that has for half a century, whatever may have been its shortcomings and defects, been the theatre of all the scientific

work and accomplishment of the college. In most instances buildings have outrun demand, in this it has lagged behind.— More than a score of young men, who knocked in vain a year ago are awaiting admission, and I think I may add, some of the other sex as well.

But as we look upon this building, as we note the enthusiasm with which its completion is greeted, the hopes which seem to centre in it, and the cordial gratitude to its generous founder expressed in every countenance, and as we turn our eyes over our country and meet similar buildings well equipped, and liberally endowed, and see students thronging their halls, we can scarcely comprehend the change in the past twenty years. Educational controversies there are, and always will be, but fortunately to-day we are spared any necessity for entering upon an argument, as then, to show why Physical Science should have a larger place in a college curriculum, at least for those who desire it. The question as to its position there seems to have been finally settled. It is there in all the prominent colleges as an elective addition, and it seems to be there to stay. We can scarcely realize that it was not always so, and yet we have the satisfaction to know, according to the report of the National Commissioner of Education, that Dickinson was not a follower in this reform, but, twenty years ago, was among the very first to venture upon it. Then it was tentative, and many who conceded a trial, did so with doubts and misgivings, and the representative champion of the "old and tried" adroitly appealed to such fears by opening his defense to the American public by an account of the failures of identical attempts at educational reform fifty years ago, and intimating that this craze for scientific education, like that, too, would pass away and not leave a permanent trace behind. There was more of rhetoric than of argument in this, to be sure, and its comforting assurances have not

been realized. The change is firmly imbedded in every respectable college, as buildings such as this demonstrate, and they also show the fallacy of predicting, that what has been will be, without recognizing changed conditions to which educational institutions must necessarily adjust themselves. President Porter failed to recognize that the world had swept on in fifty years never to move back, that new demands were upon individuals, new questions were presenting themselves for decision, new modes of thought were growing into use, and, not least of all, new points of view were opening up new vistas of intellectual activity.

That a college curriculum should be tributary to the highest subsequent success, and greatest usefulness in life, in the highest sense of the term, in any occupation, both as to the discipline it involves, and the information it affords, will, I think, be conceded by all. If with discipline must be coupled knowledge of any kind to produce the highest professional success, then the individual who gets this knowledge somehow, somewhere, without sacrificing something more valuable, will, other things being equal, achieve the most rapid and largest success; but if there is a college course that can give it to him with superadded discipline, different and better, of faculties otherwise feebly trained or almost entirely neglected, it would be folly not to select it. I desire to emphasize discipline as an end of college studies, and a chief end. There has been more misapprehension and consequent misrepresentation on this point than on any other. Those that have known no other educating influences than those of a half century ago could hardly be expected to comprehend fully the nature and scope of the new. There seems in most cases to be an assumption, that whilst scientific studies give us highly useful, practical knowledge, almost indispensable perhaps, that must be crammed because, unfortunate-

ly, we can't well get along without it, that they do so at the expense of discipline afforded by the useless branches. The immediately useful character of the knowledge is assumed to be the chief claim of the advocates of scientific culture, and this man of straw is set up and knocked down again and again with evident satisfaction. Now at the very outset the claim for these branches, if properly taught and not merely as cram, was, and is to-day, not only for highest discipline, but for a peculiar discipline of faculties otherwise neglected, a discipline that produces a truer mental balance, whilst at the same time the student is introduced to fields of human knowledge of highest interest and usefulness. I desire to emphasize this position of Dickinson because there are many who fear that there may be too much science, or perhaps simply of too directly a useful character introduced at this time. Such are referred to the position assumed twenty years ago. It stands on record again and again. It will answer for to-day. Then in absence of any suitable laboratory text-book it was necessary to edit one. So little demand for such books was recognized by publishers, that in a great measure the cost of publication had to be assumed; to-day such text-books are more than abundant, and our text-book has passed among them into its third edition. The opening sentence of its preface reads as follows:

“The growing opinion in favor of increased attention to the study of Natural Science, as a *branch of liberal education*, on account of its *disciplinary* value, as well as the practical character of the knowledge acquired, led to a modification of the curriculum of study required for the degree of Bachelor of Arts in this institution, in so far as to allow of the election of more extensive and practical study of Natural Science in lieu of the Latin and Greek of the Junior and Senior years. The expectation is *not* in this way to turn out Bachelors of Arts as chemists, etc., but simply to make this branch of a liberal education as

thorough as the times seem to demand, and to afford a foundation, if desired, for subsequent scientific pursuits.”

About the same time President Elliot of Harvard, then Professor, issued a little book for the same purpose, in which he gave as a leading object “to bring out all the reasoning involved.”

This building, with all that it implies, as far as I know, as far as my opinions or wishes may have any influence, will never cut the college loose from this position, will never lower the standard of its discipline, but will, I hope, rather enable it to carry out and expand its plan in such a way, that its students may have advantages of such high order, that it may be more than a credit to be a graduate of Dickinson when they come in competition subsequently with those of sister institutions in the professional and technical schools. Whatever else, then, may be added, let the disciplinary college course remain not only intact but encouraged. As to further expansion let it come only with demands. Let there be first the strongest possible college, a college that will command respect everywhere, that will attract students because of its high character as a college. Upon such a basis alone, if it ever should be desirable, substantial and enduring success in technical directions may be built. As we look around we see the direction of temptation. Strong colleges weakened, and hampered, and burdened financially in attempting extra-collegiate work, for which there was little demand, in multiplying electives, in aspiring in short to university character,—enfeebled colleges and not even feeble universities. Doubtless many of these would be glad to be where Dickinson is to-day; Dickinson has the advantage of their experience.

But whatever may have been the case fifty years ago we must not overlook the fact that the demands of to-day are for a different training in all professions, as well as for a wider range of information. We live in a period of richest scientific frui-

tion. Half a century ago the seeds were only germinating, the fundamental facts were coming to the surface, the grand generalizations taking shape and seeking recognition, to-day every one plucks the ripe fruitage in the multiplied and multiplying applications. The simple deflection of a magnetic needle by Ørsted, the feeble spark from a coil by Faraday are represented in undreamed of results to-day; and the reversibility of the Gramme machine and the storage of electricity may be regarded as promises and prophecies. Perhaps nothing will illustrate more familiarly this rapidity of movement than our common telegraph. A few years ago, hampered by the analogies of electric transmission to liquid flow, and with a fact so evident, that water could not be forced through the same tube in both directions at the same time, the heavens were strung with wires to accommodate the growing demand for this subtle messenger of thought. But cutting loose from the misleading theory, the wire was duplexed, then quadruplexed, and to-day multiplexed in such a way that dozens of messages may speed along the same wire at the same time in both directions, each reporting itself at its appropriate place, unconfused, and without any evidence of companionship on the way. So the reproduction and transmission of speech, a few years ago the wonder of the scientist, the curiosity of the laboratory, is to-day the commonest occurrence.— The phonograph, that fixes speech, seems only a scientific toy to-day, but we have too often seen these infants grow rapidly to giants in usefulness and influence, not to allow ourselves to hope something more from it. Photography, that a comparatively few years ago surprised us with its reproductions of human portraits, has almost unnoticed become so silently incorporated with many processes of every day life, that, blot out all the portrait galleries of the world, and it would still retain its importance as an influential factor in many industries. We hardly realize

where we come in contact with it. Even those who are looking for it sometimes fail to recognize it, as the critic of some of the most exquisite illustrations, who held up for contrast with process pictures some that had never known the graver. I have not introduced these illustrations, which might be indefinitely multiplied, for *ad captandum* purposes, to glorify science; that is not necessary; but I have taken them hap-hazard to emphasize the changed and ever-changing conditions under which we live as result of scientific activity. It requires an effort to realize where we are. Borne along by a current we fail to mark its rate of motion.

But, after all, the real progress is marked by the grander conceptions that have unified science. Fifty years ago the most advanced were groping about in the dim light for them. As an illustration, not without special interest to us, the following extract from a review of the state of the scientific world in the "Messenger of Useful Knowledge" edited by Prof. Henry D. Rogers, afterward so eminent, then Professor in Dickinson, may be allowable; the nature of light and heat is spoken of as "the key to physical science yet to be discovered, when the door will be thrown open, and a new and attractive field presented to view, in which simplicity, harmony, and beauty will be found to pervade the material universe." The introduction of the term "Mechanical equivalent" of heat was not far distant, and the evolution of the grand doctrine of conservation of energy. Even in the past twenty years as a teacher, I have been obliged to revise, modify and contradict. Words have often lost their meaning. We spake of compressible and incompressible gases, as a matter of convenience perhaps, but to-day the distinction is entirely obliterated, and even the impalpable air, and still more impalpable hydrogen, become liquid. Then we readily recognized, as we thought, three states

of matter, a fourth as different was almost as inconceivable as the mathematician's fourth dimension in space, to-day we allow Crookes to talk to us about ultra-gaseous matter, and persuade us that we are studying its peculiarities.

Well then, do what we will, we not only live in a material world that was made for us, and we in a large measure for it, but it will be investigated, will be made to yield what the greatest number will consider the greatest returns of enjoyments of life. We can not, if we will, remain stationary whilst the current in which we are sweeps on. We can, if we will, even more easily reject the free gifts of nature, shut out its sunshine, its showers, its pure air, than we can, as individuals, reject these gifts of science. We can not retain the tallow-dip, the wood-fire, the stage-coach, and many other good things of the olden times, except as expensive luxuries, after the great world has abandoned them for something it considers better.—To-day then, these multiplied applications of science touch every one, willing or unwilling, and each year adds to their number. We can not tell what they will be fifty or even twenty years hence. Who should be ignorant of the principles underlying them, or be altogether unused to the mental processes concerned in producing them? Who can afford to be? As an instance, the lawyer must take the world as he finds it. If a man wishes to litigate about a cow he must know something, at least, about a cow. If he wishes to litigate about some application of science he must know something about it, or what is of far more importance have been so educated as to be able to learn something about it very rapidly. Every new application of science brings with it its own train of cases for adjudication, of questions of rights infringed. It may be said, he can employ an expert, but he must know at least enough to employ an expert, to understand an expert, to use an expert, and not to be alto-

gether helpless in the hands of an expert, and at the same time to popularize science to a jury. The education of to-day must meet the cases of ten and twenty years to come. Should a minister of the gospel, who touches men at all points, be less thoroughly educated in these respects than a lawyer? Should any man, who claims to be liberally educated fall behind in this respect? Perhaps John Stuart Mill puts it too strongly, when he remarks, that a man totally ignorant of these things, be he ever so skilled in a special profession, is not an educated man but an ignoramus, and adds that there is no intellectual discipline more important than that which the experimental sciences afford.

But to accomplish its purpose science must be taught as science, not simply as a mass of facts. Science can be made as dead, and even more profitless, than any one thinks the dead languages are. But there is no time to consider methods of teaching, but the thought that springs up in this connection with these surroundings is that buildings are purely static elements of efficiency to a college, they need to be supplemented by the dynamic element of first-class instruction. Some may consider a building a good advertisement for a college, and so it may be; but in education it is no better policy, than in mercantile pursuits, to advertise wares different from those furnished. There may be a run for a short time, but dishonor and disaster will follow. This fine building, unsurpassed as far as I know in its adaptation for collegiate purposes, is a big advertisement of possibilities for Old Dickinson, but it may be worse than an empty show, if it fails to come up to the expectations it creates, the promises it holds out.

There is no expression of fear in this statement. A college that has developed such resources as Dickinson in the past few years, that can exhibit such friends as it has found, can not fail

now to work out its high destiny for want of the force to man, or the equipment to render effective this building. It can not perpetrate the folly of the Corliss engine, wrought out with care in plan, finished in detail, allowed to remain powerless, or rust for want of fuel and the hand to draw the lever that will start it. Fear of such a possibility would be unbecoming this occasion.

A word in regard to the origin of the building. A building for scientific purposes had long been talked of, hoped for, and worked for. At last, a few years ago, by some happy accident the oft repeated recommendation fell into the hands of an able Committee of the Board of Trustees, business men of large experience. They seemed to see something in it for the College, and for education. They were not only men of broad views, and of big hearts, but of liberal purses, and when they came with their recommendation to the Board of Trustees, it was backed with such substantial arguments in the way of liberal contributions, that it was irresistible, and in a short time the financial question was solved. With the valid subscriptions previously obtained, the \$20,000 dollars asked for was secured at the same session of the Board. But, after the plans for the building were matured, it seemed unwise to cut them down to \$20,000. Others were solicited for aid. The case was presented to Mr. Tome. He, like the rest, was a business man, and fortunately for the College, one that did not seem to know how to do things by halves. He took the whole burden upon his shoulders, relieved the sum already subscribed, to meet other equally pressing wants of the College, and this building is here to-day, as it is, an evidence of his deep interest in higher education, and we are proud of it. In looking through it, two clearly defined departments will be evident. A chemical department, with its lecture-room, laboratory, private laboratory, office and append-

ages; a similar suite of rooms for physics. This presupposes two professors. This is as far as I felt it prudent to venture at that time in planning the building. But these branches deal with dead matter and purely physical forces. There is another large class of phenomena in which these forces seem to be controlled by a force different from them. There may be those who discard the term vital force, but they have not yet been able to demonstrate life to be a product of physical forces.—They can never hope to. These phenomena are of the highest interest; they are daily receiving more and more attention in our colleges, and I venture to predict, although I know it is not safe to prophecy unless you know, that it will not be long before a third professor, of Biology, will be called into this building, and when he comes, concealed lines marking out apartments for him will be found included in the plan.

But just one more point. We have thus far spoken of instruction of a high order as the great desideratum. Such instruction, that when the student passes into the professional school he shall be able at once to take advantage to the full of every opportunity afforded for further progress in competition with those of any other college. Should the College do anything more than instruct? I know there are some who think it should not. And there are others who may ask:—What more can it do? What is the scientific pabulum the College furnishes its students? Whence do its instructors derive it? The contributions to science made through the centuries. Who have enriched science with the facts and principles that have blossomed and fruited in applications? For most part, I think I may assert, those who have taught. In America we have had our Silliman, Hare, Agassiz, Henry, and others, and there are many among the living, earnest workers and teachers, sustaining the reputation of America in the scientific world. It was as professor at Princeton College

that Henry did his best work as an investigator. The question then is, shall Dickinson be only a recipient? Shall her professors only receive, digest, impart and never give? I trust not. I trust that to-day this College enters upon a period, when there will be such facilities, such leisure for her workers here, that she will return as much as may be expected of her. She will gain doubly in this way. A live teacher will always have the spirit of the investigator, or he will soon deteriorate into a mechanical teacher, lose caste among his fellow workers and should be called upon to make way for some one more efficient. I trust that New Dickinson will not fail to take her proper place in the journals that record the progress of science for want of anything that money can supply, or for want of that modicum of time for investigation, that every teacher should have, from that spent in instruction; and in the years to come whilst the name of Jacob Tome will have a local habitation in Carlisle, graven in stone on this beautiful building, that he has erected, I trust it may be more widely known, multiplied by the press, wherever the journals recording scientific progress circulate, and enjoy the perennial vitality of ever-young science in the contributions from the JACOB TOME SCIENTIFIC BUILDING OF DICKINSON COLLEGE.

