

DES MOINES RIVER IMPROVEMENT IN ACCOUNT
WITH WM. C. DRAKE, COMMISSIONER.

Feb. 12, '59. Expenses advanced for State to Keosauqua, and other points on the Des Moines River, Keokuk included,	\$50 00
April 27th. Expenses visiting Keosauqua Court and other points tending court, &c.,	40 00
Stationery for the year ending Jan. 1, '60,	25 00
Office rent, ending Jan. 1, '60, at \$3 per month,	36 00
Moving things pertaining to office,	10 00
Bill for copy of papers of pending suits,	10 00
Oct. 25th, '59. Expenses looking after the situation of the whole Improvement,	60 00
Hire of horse for twenty days,	20 00
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	\$251 00
Interest on same counting the whole for six months at 10 per cent.,	12 50
Commissioner's salary, commencing Jan. 1, '59, and ending Jan. 1, '60,	1200 00
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	\$1463 00

ADDRESS

ON

University Education,

DELIVERED IN THE

REPRESENTATIVES' HALL,

AT DES MOINES, FEBRUARY 6th, 1860,

BY THE

REV. SILAS TOTTEN, D. D.,

PRESIDENT OF THE IOWA STATE UNIVERSITY.

DES MOINES, IOWA.
JOHN TEESDALE, STATE PRINTER.
1860.

University Education

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...thought necessary in order to acquire a knowledge of the
...of the world and his own country which would be derived from
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...the highest degree of perfection.

ADDRESS

ON UNIVERSITY EDUCATION, DELIVERED IN THE HALL OF REPRESENTATIVES, AT DES MOINES, FEBRUARY 6TH, 1860, BY THE REV. SILAS TOTTEN, D. D., PRES'T OF THE IOWA STATE UNIVERSITY.

Gentlemen of the Senate and

House of Representatives:

I am here, at the request of the Board of Trustees of your University, to address you on the subject of Education; and more particularly on that kind of education which it is the province of the University to afford. In behalf of the Trustees, I thank you for the use of this Hall, and for the opportunity to speak in a cause which I deem the most important that can engage the attention of legislators, one in which I have ever felt a deep interest; and to which I have devoted nearly thirty years of unremitting labor. My subject has not the attraction of novelty; and I can hardly hope to offer anything entirely original, or anything with which many of you are not already familiar; but if I can succeed in eliciting your earnest attention to the subject itself, by presenting the conclusions to which I have arrived as the results of reading, observation and experience, my object will be accomplished.

One of the most distinguished scholars that modern England has produced, was the son of a gardener, and followed his father's occupation till he was eighteen years of age. At that period of his life, his employer found him, one day at noon, sitting in the shade, and reading the Greek poet, Eschylus. When asked when and how he had learned to read Greek, he replied, that he had

been taught to read English by the servants on the estate, and had borrowed books from the old school master who lived near. When further questioned, it was found that he could read and translate any Greek or Latin author with ease; and he seemed surprised that any attainments, further than the ability to read, should be thought necessary, in order to acquire a knowledge of classical literature, or indeed any knowledge which might be derived from books. And the learned gardener was right. The ability to read puts the diligent student in possession of the means of acquiring all knowledge. It is the key with which he may unlock the storehouse of knowledge. It introduces him to an acquaintance with the learned of all ages. Difference of language opposes no insurmountable barrier, for with the help of books he can easily pass over it. The wisdom of past ages, the discoveries of modern times, the sciences of the whole world, lie open to him who can read. Knowledge can, indeed, be communicated otherwise than through books, but not then without the voice of the living instructor.

But the art of reading makes the learner independent of his master, and gives him for instructors the great teachers of all ages. And these great teachers are ever ready at his call. When resting from labor, when needing recreation, when kept from his usual occupations by indisposition, these masters may be summoned like spirits from another sphere to instruct or to entertain. And there is no profession, business or occupation, which may not derive advantage from a resort to the recorded experience of the past. By it even the laborer or the artizan may improve his skill, lighten his toil, and increase the product of his industry.

Of what inestimable value, then, is the ability to read. Inestimable to the individual whose interests and happiness it promotes, and inestimable to the State as an aggregate of individuals, the wealth of which must be greatly increased, by applying to the industry of a whole people, the knowledge treasured up by the experience of past ages.

Well then has it been regarded as the business of the State, to see that every child shall be taught to read. It is the business of the State, because it is the interest of the State, not only because it promotes the welfare of all its citizens, but because it provides for the increased productiveness of labor, by taking care that the muscular power of the multitudes who toil, should be directed by intelligence, and used to the best advantage.

Expensive, indeed, must be a system of education, if it costs one half the amount which is annually returned to the State by the increased productiveness of labor, which the education of the masses insures.

It has been urged as an argument for education at the public expense, that the security of property is so much enhanced by the moral effect of universal education, as to be a full equivalent for the tax on property necessary to support the system. There is doubtless force in this argument, but there is another which ought to have still greater weight with those who sometimes complain of the burden of sustaining a system of public education; and that is the increased value of capital, arising from the increased intelligence of the mass of the people. Capital and labor enter into the value of all the products of a country. If the laborer be directed by intelligence, the joint product of the two will be much greater, and both the laborer and the capitalist will be benefitted.

The skillful mechanic, merchant, or farmer, can afford to pay higher rates of interest than the unskillful, and still make a better profit for himself; for the profits of his own labor are greater. He who has land to rent will find, other things being equal, that the rent will be in proportion to the intelligence of the people, in the district where his land lies. If he would invest capital in manufactures, he will find that the profit depends much upon the knowledge of the operatives he employs. The ignorant operative wastes the material, breaks the machinery, and spoils the product of his manufacture. I have heard an experienced manufacturer say that where complicated and expensive machinery was used, he could afford to pay the American operative double the wages of foreigners, on account of his superior intelligence and skill in the management of machinery.

In our own state, we have still a better argument for a system of universal education. We have a broad extent of fertile land lying waste for want of cultivators. The natural increase of our population would not be sufficient to occupy them, for a century to come. They must still lie waste, or be filled up with emigrants from the east. The best class of emigrants will find a judicious system of public instruction a strong inducement for coming among us. The first question asked, by this class, when thinking of removing to the west, is, can I find schools for the education of my children? The common impression is, that they cannot. This

impression will, in time, be corrected, by giving permanency and efficiency to a judicious system of education. The land holders among us, if they understand their own interests, will not complain of the burden of taxation necessary to support it; for it will bring their lands into market, and enhance their value. For the same reason, the non-resident land holders ought willingly to bear their part of the expense. It might save them from heavy losses. Everything which makes the State a desirable residence, will be especially beneficial to them.

Nothing could be more unwise and unprofitable than to cripple the system of public instruction lately put in operation in this young State by an untimely parsimony. It has in it elements of development, which with slight modifications, will adapt it to the condition of the State, when it shall have quadrupled its population. If it have defects, they had better be borne with, till a fair trial has been made. Even a defective system, faithfully administered, is to be preferred to those continual changes, which destroy public confidence, and give the impression abroad, that there is no element of permanency, in the educational institutions of the west.

The remarks which I have made, apply, mostly to our system of common schools; a system which aims to teach every child to read, and thus puts every one in possession of the key of knowledge. Reading is the main thing to be taught in the common schools, but much more is necessary, as auxiliary to this. Perhaps not one in ten thousand, could be found, who, like the distinguished professor of oriental languages in Oxford, mentioned above, could proceed from the mere knowledge of reading, unaided to higher attainments. The studies of the common school are, properly, reading, writing, arithmetic, English grammar, geography, and such knowledge of history as the exercises in reading may afford. Higher than this the instructions of the common school should not go; for the benefit of a higher education than this, cannot be common to all. The poor man cannot afford to have the time of his children employed upon higher branches; for he needs their services at home, and while the teacher is engaged with his more advanced scholars, the children of the poor are defrauded of the attention which belongs to them.

A strictly elementary education, gives every one the power to profit by the means of knowledge within his reach; and if in addi-

tion to this, he wants further discipline, and further assistance from his instructors, it should be at his own cost. And it should be at his own cost, because it is for his own individual benefit. It forms a part of his capital in business. It gives him social and intellectual superiority; and it is unjust, that the income of the school fund, and the money of the tax payer, should be expended for the benefit of those who for the most part, can well afford to pay their own expenses.

But has the State then no interest in institutions of learning, higher than the common schools? This by no means follows from what I have said. It should not it is true expend its funds, and tax the property of its citizens, in sustaining high schools and colleges, simply for the purpose of benefiting those who resort to these schools for education; for this would be expending the public funds, for the benefit of a few; a course of action utterly at variance with the spirit of our institutions.

But the State has an interest in higher institutions of learning; and in proportion to this interest, should the public funds be freely granted. Let us inquire what is the amount of that interest? We may divide educational institutions into three classes; the elementary, the intermediate, and the highest. The first is the common school, the second high schools and colleges, and the third, the University. In the first, and last, of these, the State has the most direct interest. In the intermediate, it is interested only as far as they contribute to the perfection of the other two. The common school prepares all the citizens for the reception of knowledge. The University originates the knowledge to be received. Without the first, there could be no general diffusion of knowledge; without the second, there would be no advance in knowledge. What would avail the art of reading, if there were nothing to which it could be applied? If there were no advances in knowledge, society would remain stationary, and our civilization would become like that of the Chinese, a petrification of the civilization of past ages. The highest educational institutions have ever taken the lead in the advancement of learning. The universities of Europe, established in the dark ages, were the pioneers of modern European civilization. The universities and great schools of modern Europe and America, have been the originators of those vast improvements in physical science, which have distinguished the nineteenth century above all others. The great inventions of modern times,

which have added so much to the physical comfort of the human race, which have subdued the elements of nature to our control, and annihilated time and space, had their origin, either directly or indirectly, in the higher seminaries of learning. In them were investigated those principles of science, which when applied to practical purposes, have been productive of such happy effects on the material condition of mankind. They have scattered throughout the civilized world multitudes of learned men, and careful observers, eager to notice every phenomenon which might reveal the mysteries of nature, and teach mankind to imitate and control her secret operations.

There is a common belief that practical men, with little learning or cultivation, have been the great discoverers and inventors; and that to them alone we owe, all the improvements in the practical arts. But this is a great error. The learned must investigate the principles of science, before the ingenious artizan can apply them to the purpose of life.

Watt, and Whitney, and Arkwright, did nothing more than apply principles, which had been investigated long before by learned men, either belonging to the Universities, or trained in them; and without these principles, they never could have proceeded one step in their inventions. Watt could never have perfected the steam engine, had not Dr. Black, of the University of Glasgow, first investigated the laws of steam. George Steers could never have modeled the beautiful curves of his swift sailing ships, had not mathematicians investigated the properties of curves, and philosophers discovered the laws of Hydrostatics.

Allow me to give an illustration from history, to show how the labors of the learned, are combined with skill of the practical artist, for the benefit of mankind.

Sixty years ago, Galvani, a learned physician, educated in one of the Universities of Europe, and a curious observer of nature, noticed that the muscles of the legs of a frog, which his cook was preparing to dress for dinner, suddenly contracted, when touched by two different metals in contact with each other. After repeating the experiment, which at first was the result of mere accident, he came to the conclusion, that some power was developed by the contact of two metals, which acted upon the nerves of the dead animal, and caused the contraction of the muscles. This power he called animal electricity; and after a series of experiments

with many different metals, he gave the results to the world. Immediately the subject was taken up, and investigated in the Universities of Europe, and also in our own country. Twenty years passed away, during which time, hundreds of experimentors strove to improve and perfect the science of Galvanism, as it was called from the discoverer. By these experiments it was shown, that the phenomena produced by the contact of two metals, were identical with those of electricity. Galvanic batteries were constructed which produced wonderful effects. Intense light was produced, metals were burned, and new chemical decompositions effected by the Galvanic current, but nothing eminently practical had been accomplished.

But twenty years after the discovery thus accidentally made by Galvani, a similar accident revealed another property of the Galvanic current. Professor Oersted, of Copenhagen, was making experiments with a small galvanic battery, placed on a table in his laboratory. A magnetic needle balanced on a pivot, happened to be standing near the wire used to connect the poles of the battery. When the connection was made, he observed that the needle was deflected from the magnetic meridian, and took a position at right angles to the connecting wire. This circumstance, which might have been deemed a matter of little importance by many, revealed to the learned professor, trained to question nature, a new and important law. After a few experiments, he made public his discovery, and the learned of all countries, set themselves to work, upon this newly discovered law of nature. Hundreds of minds trained to scientific pursuits, bent their attention to this one subject, and little by little the laws of electro-magnetism were discovered, and classified into a science. Faraday in England, and Henry in our own country, were the most eminent discoverers in the new science. Henry made magnets which sustained more than a ton, and proved that the magnetic force induced by a current from a galvanic battery, was not sensibly diminished by the length of the wire through which it passed.

The laws of electro-magnetism, thus happily developed by the learned, gave opportunity for the exertion of mechanical genius, in applying them to practical purposes. The Galvanic current was found to be a powerful agent in the laboratory of the chemist. Then followed the art of Electro-plating, by which, without loss of material, the precious metals are spread with perfect evenness

over the surface of any metal whatever; preserving the minutest figures and lines engraved on the original. A beautiful and useful art, which has both perfected and cheapened the plated utensils used in our houses, and reduced the price within the means of almost every family. The same principle was next applied by a lucky thought of some practical mind, to the art of printing, and wood engraving, so as to make exact copies of types and engravings in copper, and thus render the plates from which books are printed, almost indestructible by use.

In another branch of the science, Prof. Morse, by a happy mechanical contrivance, applied the law discovered by Henry, and constructed the Magnetic Telegraph; that wonder of the age, which brings near distant countries, and sends the thoughts of men coursing around the world, with a speed equalled only by a ray of light from the sun. And we have no reason to think that we have yet reached the limit of the application of this newly discovered power in nature, and it is not extravagant to say that it may yet light our cities, warm our dwellings, drive our machinery, and drag, with fabulous speed, the heavily laden car upon our Railroads. And all this is the result of a law of nature, indicated to a philosopher by the leaping of the leg of a dead frog, a circumstance which an ignorant man would have regarded with stupid astonishment; or, if superstitious, have attributed to the agency of the Devil. The benefits, and I mean merely the pecuniary benefits, secured to mankind by the development and application of this one law of nature, would overbalance the cost of founding and maintaining all the Universities in Christendom, since the period of the dark ages until now.

I have given you an illustration, from the discovery and application of the principles of a single science. I need not for my present purpose, mention particularly any other. I would only remark, that in most cases, a long series of investigations and experiments seem to be required in order to bring a new discovery to the point necessary for practical application.

That beautiful art, by which the sunlight is made the limner in depicting natural objects and even the lineaments of the human countenance, on various substances, was by no means the consequence of a single happy thought of the individual, whose name has been given to the process. Daguerre worked with materials made ready to his hand, by experimentalists who had gone before

him. The chemical effect of light in changing colors, was noticed as early as 1802, and attempts were made to apply the principle. Diepce, in France, labored more than twenty years for this purpose, and died just after he had made a discovery which had nearly perfected his pictures. Daguerre, more fortunate, by a few slight additions to the discoveries of his predecessor, brought the art to a degree of perfection which rendered it practical. But neither of these men were solitary workers in their respective departments of knowledge. Discoveries simultaneously made in the laboratories of Europe, were applied by them, in their investigations, and without these discoveries their success would have been impossible. And their art has, ever since its discovery, been progressive, and is still advancing from the continued application of new principles, furnished to the artists by the discoveries of the learned. And let no one suppose that the discoveries of the nineteenth century have exhausted the domains of nature, leaving nothing farther to be explored. We have only begun to penetrate into her secret mysteries; and new wonders meet us on every side as we advance; and the farther we advance, the wider appears the region to be explored. Of that mysterious substance, the effects of which science has lately opened our eyes to behold in the lightning, in the telegraph, and in the magnetic engine, and a hundred other forms, we as yet know comparatively little. There are indications of its agency in light and heat, and in vegetable and animal life; and who can tell what benefits may not accrue to mankind, from a further investigation of its properties and its laws?

All the sciences seem to be linked together by innumerable connections. An advance in one, paves the way for improvements in all subjects which a century ago it was deemed presumption to approach, are now open for investigation and experiment. The laws of vegetable life, once deemed so mysterious, are beginning to be discovered, and may yet be so well known that by their application to agriculture, as to increase four-fold the products of the earth. And may we not hope, also, that the light which other sciences are beginning to throw upon the mysteries of our own physical frame, we may learn, if not to lengthen out the span of mortal life, yet to remove or relieve much of the pain and suffering which attend it?

But not only do all the sciences afford mutual aid in the devel-

opement of each other, but every region has its own peculiar advantages, for the cultivation of particular branches of science, climate, soil, varieties of vegetable and different conditions of animal life, give each region peculiar facilities for investigating the laws of nature. These laws are more easily discovered by observing their results, under different aspects and relations, and the application of them to practical purposes, can be successful only when the conditions under which they operate, in different regions, are taken into the account.

Hence, every part of our country needs its well trained minds, laboring for the advance of knowledge, adding their tribute to the common stock, and enriching at the same time their own section, by adopting the science of the whole world to its own peculiar condition. Our own region, with its wide extended plains, its fertile soil, enriched with the vegetable deposits of centuries, with its mineral riches, its climate, modified by the distant but lofty chain of mountains on the west, with its varieties of vegetable and animal life, opens a wide field for scientific investigation, and demands a band of well trained scholars, educated upon its soil and familiar with its peculiarities to develop its resources.

But, besides the advances of science resulting from a careful observation of nature, there is knowledge to be gained from the experience of the past. There are mines of intellectual wealth in the volumes which record the wisdom of those who have gone before us. Those grave and important questions which relate to law, policy and government can be settled only by a recourse to the records of the past. "History is philosophy teaching by example," and the only true philosophy of man is deduced from the records of history. In this department of knowledge the student cannot make his own experiment. The experiments have been made for him, and it is for him to search and compare the records of their results. What may be the best form of government, what the wisest system of laws, and the most efficient method of executing them, are still problems for solution. They are problems affecting our dearest interests, and yet the wisest and best of men have given attention to them generation after generation, without arriving at anything more than approximate results.—There has been progress, indeed, but there is room for further advancement. Grotius, and Bacon, and Bentham,—Hamilton, Madison, and Webster, and many others of like character, have

begun the work and bequeathed it to us. We have a rich inheritance of knowledge from those who have gone before us, and we have only to cultivate it with industry and zeal in order to add to it still more valuable acquisitions.

But it is mostly on our universities that we must depend for the advancement of knowledge; for, in them only, as a general rule, can be found the means and appliances for investigations. We cannot depend upon individual enterprise, for few have means adequate to procure the apparatus, purchase the books, and make the collections necessary for extensive investigations in science. And besides, those who are born rich, seldom have the disposition; and those who have accumulated wealth by their own exertions, seldom have either the time or the taste for scientific pursuits. Money invested in these pursuits, would evidently be a bad speculation.

The nobility and the princes of Europe, have sometimes been munificent patrons of science; but we hope the time is far distant when such inequality of condition shall exist among us, and such large estates be accumulated, as to allow of the same patronage here. With us, the people are the rulers, and they should take the place of the kings of the old world, in promoting the advance of knowledge. It belongs to the people, or to the government of the State, which is the same thing, to provide for the advancement of knowledge by providing means for the support of a State university.

And here the question arises, what is a university, or rather, what ought it to be? It is not only an institution where knowledge is disseminated, but where it is also originated. It is a place both for instruction and investigation; and for its complete efficiency would require, first, substantial buildings, not gaudy and expensive buildings, but buildings suited to the purpose; ample enough to contain all the appliances of learning, and furnish accommodations for those who resort to it for instruction. Second, a library, selected with reference to its uses, rather than to the rarity or beauty of the books which it contains; a library which may help the student to the knowledge of all that has been done by the generations before him; one in which the student of every science, and every profession, may find whatever aid the wisdom and experience of past ages may furnish. Thirdly, a chemical and philosophical apparatus sufficient to illustrate all the main princi-

ples of science, and furnish the means for experimental investigations; and a cabinet of natural history, containing specimens of all the principal productions of nature, whether mineral, vegetable, or animal, and properly arranged for the inspection of the student.

To these material riches of the University should be added, a corps of living instructors, learned in their several departments of instruction; and not only enthusiastic in their several pursuits, but capable of inspiring enthusiasm in their pupils. A professor in a University should be more than the mere teacher, the drill master of the recitation room. He should be an earnest worker for the advancement of human knowledge, and be ambitious to add his own contribution, to the discoveries of the age. Such in brief would be a complete University, and such an institution of learning when in successful operation, would supply another important auxiliary in the cause of human progress; a body of learned men thoroughly educated and prepared to understand and appreciate the discoveries of the votaries of science. Such a body of scholars is indispensable to the progress of knowledge.

Many valuable discoveries, made in the dark ages of the world, were lost to mankind, for the want of those who could understand and appreciate them. Men have frequently arisen among uncultivated nations, and given utterance to thoughts so much in advance of their age, that they were regarded as visionaries and madmen. The telescope, and many other useful optical instruments, were probably invented by Roger Bacon, in the 13th century, but he was accounted a wizard for his pains, and was fortunate in escaping being burnt at the stake. And how could the votaries of science be rewarded, and encouraged, were they not well educated men, who could understand and duly value their labors. Men who have most benefitted the world by their scientific labors, have cared little for pecuniary rewards; and they could not command it if they desired it. The products of the labor of the brain are immaterial. They cannot be made merchandize of, and sold and bought, for the benefit of the producer. The thoughts which have cost years of painful toil to arrange and perfect, when once published, are equally the property of all. There can be no process by which the multitudes who are benefitted by them, can be compelled to give an equivalent in return. The discoverer of an important principle may starve, while thousands grow rich on the fruits

of his labors. The inventor, who applies the law, which the philosopher has discovered, may have the right to his invention secured to him, by letters patent from the government, and realize a fortune by the means; while he, without whose labors the invention could never have been made, goes unrewarded. Professor Henry after years of patient research discovered the laws of Electro Magnetism; and never received sufficient for his pains to pay one tenth part of the cost of his experiments. Mr. Morse, with far less labor and expense, contrives an ingenious piece of clock work, which beautifully applies the law to practical purposes, in the magnetic telegraph, and makes a fortune by the invention. The latter receives his reward in money—the former must be content to take his in reputation; and for want of sufficient information in the public, must even share that with the inventor; for how few know, or care to know, that without the discoveries of Henry, Morse never would have made his invention. Gratuities and pensions from Government are in many countries, the rewards of discoverers; they have never been so in this; and on account of the abuses to which they are subject, perhaps ought not to be. Nor does the true worshipper at the shrine of knowledge, demand or desire them. He is amply paid, if he knows that his labors are appreciated; and he is stimulated to new exertions, by the assurance, that he is acting in the presence of competent judges, who know the value of his labor, and will award the due meed of praise. The mean man labors for money; the high minded for glory; but the scholar's glory, can only arise from the approval of intelligent and cultivated minds.

And I see not how this higher education, so important to the interest of the State, can be better encouraged and secured, than by the establishment of a State University. As I have intimated before, money invested by an individual in scientific pursuits, would not be profitably invested. Still less profitably could it be invested in supporting an institution of learning, of the first class. All institutions of this kind, are supported either by funds supplied by government, or contributed by individuals zealous in the cause of education, without expectation of any return. Few could incur the expense of a complete education, if the fees for instruction were high enough to pay full salaries to the professors, and the interest on the investment in buildings and other fixtures.

In Harvard University the tuition would exceed \$225 per annum;

in Yale College, \$200; in the University of Virginia, \$150; in the University of Michigan, \$100. I have named these Universities because they have large numbers of students, and consequently the cost for each student is less in proportion to the outlay in capital. In the two last named, the amount invested in fixtures is much less than in the others, and the cost of tuition is less. In smaller institutions, where there has been a great outlay in capital, and a limited number of students, the cost is from \$250 to \$300 per annum, for each student.

These figures, while they show that the higher educational institutions cannot be sustained by the fees paid by the students, show also the great importance of concentrating in a single one, the whole patronage of a State. The lecture-rooms, libraries, apparatus, and professors needed for fifty students, would suffice for one hundred and fifty. Increase the number to three hundred, and but a moderate additional expense would be incurred, and that almost entirely for the increase of the number of instructors. In the older States, no regular system of public instruction was adopted, and colleges were injudiciously multiplied. They were established mostly by the different religious denominations, and occasionally aided from the public funds. The result has been a great waste of money; while in some of those States, rich and populous as they are, no first class institution exists. In the State of New York there are no less than ten institutions, some called colleges, and some universities, all claiming to belong to the highest class. The outlay necessary for buildings, libraries, apparatus, cabinets, &c., to make these institutions what they claim to be, would be at least a million and a half of dollars. One half of this would be a magnificent endowment for a State university, which would be worth more to the cause of education than all of them put together. Instead of ten small libraries, ten imperfect sets of apparatus for the illustration of the sciences, and ten diminutive cabinets of natural history, there might have been one of each, worthy of the name, to which the scholar might resort for whatever information he could desire. And one first class university would be sufficient for the whole State of New York. We will suppose these ten colleges and universities, as some of them are called, have an average of two hundred students each,—which is rather above than below the actual number,—making two thousand in all; this would not exceed the number in some of

the European universities. But of these two thousand students, a small portion only are prepared to be benefited by the instruction which should be given in a university. In the first two years of the course of study, prescribed in these colleges, nothing is taught which requires the aid either of an extensive apparatus or a large library. In the greater part of them, chemistry, natural philosophy, and natural history, are reserved for the last year. The lower classes are usually the largest, and we may safely assume that not more than one-fourth part of the students of these institutions are profited by the large outlay made in apparatus, libraries, &c. Five hundred students would not be too large a number for a single university, and we have a right to infer that these would enjoy superior advantages, and receive better instruction in a well arranged university, the cost of which would not equal a third part of what is laid out in these ten institutions. As regards the remaining three-fourths, they need not such costly arrangements. Languages and pure mathematics require few books, and no costly apparatus, and can as well be taught in schools, where those disposed to be idle can study under the eye of the teacher.

The great schools of Eaton, Rugby, and Harrow, in England, and the Gymnasia in Germany, are fully equal to our colleges, in teaching languages and pure mathematics; but they have expended but little in such fixtures, as more properly belong to the universities. Such schools as these, should occupy the post between the common schools and the university. They need not be expensive. They are properly schools for the discipline of the faculties, rather than for the acquisition of great stores of knowledge. Their teachers should be men of learning in their several departments; but great learning would be less essential than the tact to call out and direct the mental powers of their pupils.

There are properly three stages in a complete education. They may be called that of reception, or cultivation, and of acquisition. The first is particularly characterised by the reception of knowledge. It begins in early childhood, when the parent communicates to the trusting child, those rudiments of knowledge, which enable it to guard itself from danger, and enjoy its little pleasures. It is continued through the early school days; while the boy looks upon his teacher as a prodigy of learning, and receives as unquestioned truth, whatever he communicates. When rules are

committed to memory, and applied without a knowledge of the principles on which they are based; when books are regarded as infallible, and printed matter as undoubted truth. This stage of education belongs to, or rather ends with the common school.

The second stage of education, which I have called the stage of cultivation, begins with the development of the reasoning powers; and is mostly employed in the discipline of the faculties of the mind, preparatory to the acquisitions of riper years. It is the stage when the memory, the judgment, and the imagination should be cultivated, and disciplined to act in harmony; when order and method should be acquired, and habits of application formed; when moral principles should be inculcated, and religious impressions confirmed, and self-control acquired; when, in short, the whole character, intellectual, moral and religious, is in a state of formation.

This is doubtless the most important stage of education, and may generally be completed, or perhaps I ought to say, is completed, at the age of eighteen or nineteen years. To this important stage belong the high school, academy, or college; their business is the same, by whatever name they may be called. The object is discipline, not knowledge; but whatever knowledge may be acquired along with the discipline, is so much gain to the scholar. Languages, mathematics, logic, and the elements of rhetoric, answer well the purposes of mental discipline; while they lay the foundation of more extensive acquisitions after this stage of education is completed.

The great error is to mistake the object of this period, and endeavor to make its principal object the acquisition of knowledge. On account of this error, you will often find this period crowded with studies, in such number and variety, that no human mind, however active, can acquire more than the most superficial knowledge of each; so superficial as to be utterly worthless for practical purposes. And while the time of the student is wasted, in respect to useful knowledge, the hours which should have been given to discipline, are worse than wasted. There has been discipline, indeed, for since it is the period of life during which the mental character is formed, discipline cannot be avoided; but it is the discipline not of order, but of confusion; not of method, but of dissipation. Many books are a nuisance in this stage of edu-

cation. The great readers in the lower classes of our colleges, are invariably the poor scholars, and will be found the worse educated at the close of their course.

If you would improve the mental powers, they must be put in energetic action, and confined at the time to a single subject; for thus only can habits of close attention and thorough investigation be formed. Whatever, therefore, has a tendency to turn the attention from the main pursuit, to subjects unsuited for mental discipline, is injurious. The schools designed for this period of cultivation, have no need of large libraries, expensive apparatus, and cabinets of natural history; and the money laid out for these is worse than wasted. The most successful institutions of this kind with which I am acquainted, have them not.

The third stage of education, is that of acquisition. When the powers of the mind have been duly developed, and trained to action, the acquisition of knowledge becomes easy. This is seldom the case till the pupil has reached the age of eighteen or twenty years. He then no longer needs the drill of the recitation room, or the careful oversight of a master. If he cannot then study without constraint, or acquire knowledge without the constant inculcation and repetition of an instructor, his case is hopeless, and he should be advised to abandon his purpose, and betake himself to some pursuit in which little attainment is required. But if he have received the proper discipline, he is prepared to profit by all those appliances of learning, which should properly belong to the University. He now ceases to study text books, and studies subjects. The lectures of the Professor, or some judicious compend of a science, may direct the order of his studies, but he consults other authorities, examines and weighs the evidence and arguments, forms his own opinions, and rests upon his own conclusions. His knowledge then becomes, in a peculiar manner, his own. It is not simply an act of memory referring to the pages of a book, but it is a part of his own intellectual consciousness. It is knowledge, which he can with confidence, apply to practical purposes. And the University should be a place, where knowledge of this kind, on all known subjects, could be acquired. Not that every student would be expected to perfect himself in all knowledge, or give his attention to all the subjects of knowledge. This would be folly, unless he had reason to hope, that he might reach the age of the antediluvians. But the means should be

provided for the acquisition of every kind of knowledge, and the student allowed to select the studies which his taste, inclination, or peculiar talents fitted him best to pursue. It would be useless here to enumerate all that should be taught in an University, but the leading studies, and such as should be pursued to some extent by all, may be comprised under the heads of ancient and modern languages, and literature; pure and mixed Mathematics, Natural Philosophy, Chemistry, and Natural Science, Metaphysics, Political Economy, History, and International law. Professional schools, for law, Medicine, and Theology, would be improved by a connection with the University, as they might enjoy all the advantages of its library, lecture rooms, and historical collections, without additional cost to the Institution. Schools of this kind need not be supported at the public expense. They are schools designed for the sole benefit of individuals, who can well afford to pay the expense of lectures, while they enjoy all other advantages of the University. Theological schools, in our country, must of necessity be supported, wholly by the several religious denominations; but they might all have equal privileges in the University; each Christian denomination might establish its own separate school, and support its own teachers; and who can doubt that a spirit of true Christian liberality and charity, would be promoted by the free intercourse of students of different creeds and modes of worship, in the same general Institution.

In speaking of the three successive stages of Education, and the schools proper to each, I have sketched a system of public instruction which I should deem the most efficient, and at the same time the most economical, that could be adopted. It would require, as has been shown, these classes of Educational Institutions, Common Schools, Intermediate Schools, and Universities; and a single University would be sufficient for a State, even after its population should amount to three or four millions. I believe it would be most efficient, as it would be calculated to call forth, and develop, and discipline, the best talent of the State, and open for it a wide field in which to act. I believe it would be the most economical, because it would save the expense of a great many small libraries, and a great many diminutive cabinets, and imperfect sets of philosophical apparatus, and collect, at a far less expense, in one institution, all these means of knowledge, in a quantity sufficient to be eminently useful. It would save also the sal-

aries of a large number of professors, who would otherwise be wanted to teach in a great number of Colleges, what properly belongs to the course of studies in the University.

One question still remains, and that is, what provision could be made for the moral and religious instruction of the youth of the State, in such a system as is here proposed. I do not disjoin moral, from religious instruction and training, because I believe them to be inseparably connected. I have never known morals to be successfully taught without religion; or a religion, that was worth anything without moral practice. Had we all the same religious belief, there could be no difficulty whatever in carrying on intellectual and religious training at the same time, and by the same instructors. But where we have so many creeds, and so many separate religious bodies, not at all times on the best terms with each other, and always a little jealous of each other's influence, it is not easy to construct a system free from objections. In the common schools, it is evident that but one course can be taken. The children of all the different religious sects must meet in the same school, and the peculiar creed of no one can be taught in the school. The teacher must enforce the rules of Christian morality, in which all agree, and leave religious instruction to others. The attempt to have schools established by each religious persuasion, would destroy the schools, except in large towns. Nor is it particularly important that religious knowledge should be communicated in these schools. The children are, for the most part, too young to understand the differences which separate the various religious sects. They are but a few hours in school, and the remainder of the time they are at home with their parents, who can either teach them the principles of their own religion, or employ persons of their own way of thinking, to do it. The Sunday Schools of the different Christian denominations, may well give the religious instruction, which in a country where uniformity of faith prevailed, would be given in the common schools. It would be difficult, however, in the intermediate schools. These schools could not be established in every neighborhood. Children and youth must be sent from home to attend them, in most instances. It is natural for parents to desire that their children, when, from home, should be subject to the religious influences which they approve. It is right that they should do so. This is not bigotry, it is simple sincerity. I honor them for it. And the

religious influence of the the teacher is most important in these intermediate schools, for it is in this stage of Education, that the moral and religious, as well as the intellectual character is in a state of formation. There is, therefore, no objection to denominational character in these schools. Among the number which are sure to be established, the parent will always be able to find one of his own type of religion. If he sends his child from home, it matters little, with our present facilities for travel, whether he send him twenty miles or an hundred. If the school be in his immediate neighborhood, so that his son lodges at home, he can himself attend to his religious teaching. If this class of schools are to receive anything from the public funds, no difficulty need arise from their religious character, for the amount can be impartially distributed, either according to the whole number of pupils, or in proportion to the services rendered the State in educating teachers for the common schools. This much will suffice for the religious instruction in the intermediate schools. But in the University a different system must prevail. The University is for the whole State, and for all religions denominations. It can, therefore, teach the creed of none. Nor is there a necessity that it should afford any religious instruction, whatever. By the time the student has progressed far enough for the University, his religious education may be supposed to be complete, and his religious character formed, so far as it can be done by instruction. He is then, like any other citizen, free to choose for himself, the religious influences to which he will be subjected. As in our towns the citizens mingle through the week in business, or social intercourse, and then go to their separate places of worship on Sunday. I see not why the students of the University could not be associated in the pursuits of science during the week, and worship, each where he might please on Sunday. If the parent still wished his son to have a religious monitor, he could commit him to the care of the minister of his own church. The University could not have a denominational character, and no one ought to desire that it should; and I see no difficulty in establishing it upon the same broad principles of religious liberty, which are recognized in our civil institutions.

Having sketched these general features of a desirable educational system for a State, it remains to be shown how far they can be applied to the circumstances of our own State. It is by no means

derogatory to the honor of our growing State, to say, that we are not sufficiently advanced to adopt such a system, in all its parts, at the present time. That part which refers to common schools, is already in successful operation. Many intermediate schools have been established by various religious bodies in our State; and some of them are in a flourishing condition. But we have as yet no University, worthy of the name; nor is it probable, that a complete institution of that kind, requiring high attainments for admission within its walls, could, at once, be put in successful operation. In a new country the demand for high scientific and scholastic attainments, is not sufficient to induce many persons to spend a long time in acquiring them. The number of students who would be desirous of pursuing a strict University course, such as has been described above, would be too few to warrant the establishment of an institution for that course alone. Nevertheless, it is wise that legislation should, from the first, look towards the perfection of the system, and shape its course with a view to its final completion.

If we cannot establish an University of the first class at once, we should aim to put in operation an institution which will supply the highest educational wants of the State; and thus take away the necessity of a resort to the institutions of other and distant States, for the completion of the education of our young men.

What we have now to do, is to lay well the foundation, and build upon it, as the exigencies of the country may demand. We may begin, by fixing the qualifications for admission to the University at a very moderate standard, and raise the standard as the demand for higher scholarship increases, and the intermediate schools prepare their scholars more perfectly for admission. The University, from the beginning, should be made the best institution in the State. It should be provided with able professors, in the leading departments, and with means to make their instructions efficient in the way of books and apparatus. It should have such accommodations for students as to make it a desirable residence, and the expenses of board and instruction should be within the means of persons of moderate circumstances.

Such an institution, if conducted with prudence and energy, would not only concentrate the patronage of the whole State, but would attract students from abroad. It could easily be enlarged so as to meet the growing wants of the community, and become

both an honor to the State and a blessing to coming generations. If now we can put the University considerably in advance of the Colleges already founded by private liberality, it can, with the funds already provided by the General Government, easily maintain its superiority. It will not be a rival, but an ally of these institutions. It will complete the education which they begin, and which they cannot well finish, without an outlay much beyond their means. It will stimulate their students to industry, who will be desirous of taking a high rank in the University, and graduating with honor from the first institution in the State. It will fix a standard of scholarship for all the inferior schools. It will educate professors for the Colleges, and teachers for the high schools; and these in turn will prepare teachers for the common schools, so that its influence will be felt in the whole educational system of the State. It will be a centre of light in the midst of the system, sending forth its rays on every side, and illuminating, with its cheering beams, the humblest school house by the way-side.

What I have said in favor of a State system of education, with a University as its head, is clearly supported by the experience of those who have put such a system in operation.

In Virginia, a State University was established about forty years ago, and the bounty of the State, with a few exceptions, has been confined to this one institution. Its success has been triumphant. It is now the first institution in the South, and boasts a large body of professors, as able as any in the land, and numbers above seven hundred pupils.

At a later date, North Carolina established her State institution at Chapel Hill. It, too, has been eminently successful, and now sends forth large numbers of well educated men, whose influence is felt in that spirit of improvement which of late has begun to pervade the State.

The Western States were provided by the liberality of Congress with the means for founding Universities. Two townships, or seventy-two sections of land, were given to each for that purpose. In only one of these States has the experiment of a State University been *fully* tried: and there it has succeeded even beyond the most sanguine expectations of its founders. The State of Michigan, at an early date in her history as a State, made provision for a State University. The lands given by Congress were sacredly set apart as a fund for that purpose, and a school was established

sued to the wants of the State. This school, which was always in advance of all the institutions of the State, has been constantly improving, and may now justly claim the name of University. It has now twenty-four professors and assistant professors, and four hundred and thirty students; and its course of studies compares favorably with any similar institution in the land. The funds, with careful management, now yield an income exceeding \$30,000 per annum.

In Wisconsin the same wise policy has been pursued, and the gift of Congress has been forever secured for the purposes of the State University. With a spirit which is honorable to that young State, the Legislature added to the fund seventy-two sections of land subsequently ceded to the State by Congress, so that the University has for its foundation one hundred and forty-four sections of land, valued even now at \$300,000.

From the University of Wisconsin we have yet no right to expect the same success as that which has been achieved in Michigan. It has not been so long in operation by near twenty years, and the State being new, there is not so great a demand for a high standard of education. Other circumstances have also retarded its growth. It had not the necessary buildings and fixtures. The town in which it is located was rapidly built up, and crowded with inhabitants, and there were no accommodations for the board and lodging of students. These deficiencies have been remedied by the erection of suitable buildings, and the University of Wisconsin, with her able chancellor and professors, will soon take her stand among the first educational institutions of the West.

IOWA STATE UNIVERSITY.

Our own State University has partially failed for like causes. It was organized and put in operation in 1855, but it had, at the time, neither buildings, apparatus nor library, at all adequate to the wants of such an institution. It became a mere local school, for there were no accommodations for students from abroad. For the results of this experiment, of establishing a University with such limited means, I quote the language of Mr. Fisher, the accomplished Superintendent of Public Instruction, in his report to the General Assembly in 1858.

“— The whole number of students in the University, is one

hundred and twenty-four. Of this number 65 are in the preparatory, and 40 in the Normal department. Some students are both in the preparatory, and in the Normal departments; and some from both these departments, receive instruction in the departments belonging to the University proper; but there are probably not thirty of the whole number pursuing a regular University course. This is indeed a small number. But of the whole number of students, 103 are from Iowa City, and of the remainder, 14 are from Johnson county, and only seven from other counties in the State. Thirty students may be a small number for a whole State, but it is sufficiently large for a single city. We come then to this result, that the benefits of the University are almost exclusively confined to Iowa City. This is not the fault of the people of that city. The University is established there by law; and they avail themselves of the advantages which it affords, as they have a right to do.

We have a University munificently endowed, with faithful and able professors; yet our young men are obliged to resort to other States to obtain a classical education. And the reason is this, we have made no provision to accommodate them with suitable rooms for study. It costs a young man, seeking a liberal education, more to procure board and a suitable room for study in Iowa City, than his whole education would cost in most of the colleges of other States. But let there be a suitable building erected to accommodate students with rooms, and a liberal education may be acquired with as little expense here, as at any College in the United States. It now remains only for the State to defray the expense of erecting the proposed building. It is indispensable that this should be done, in order that the people of the whole State, may participate in the advantages of the University; if not it must become a local institution, devoted to the education of the boys and girls of Iowa City."

Such was the language of the report, made to the General Assembly in 1858, and for the reasons given in the report, the Trustees closed the University, except the Normal department, until the means could be obtained to erect the necessary buildings. They estimated the cost of a building for students' rooms, and the repairs and alterations necessary on the State House at Iowa City, (which had been given to the University); at twenty-five thousand dollars; and asked the legislature to make an appropriation of that amount in order to enable them to put the University in success-

ful operation. Thirteen thousand only was granted. Three thousand for the repairs on the State House, and ten thousand to be expended in the erection and completion of another building. Neither of these appropriations was adequate to its object.

The three thousand dollars appropriated for the repairs of the State House, were expended in putting a new roof on the building, in place of the old one, which was leaky and rotten; and in fitting up rooms for the Library and Cabinet of Natural History. The ten thousand for students rooms, were laid out in a building designed for that purpose. That building remains in an unfinished state, being simply enclosed and roofed, and no rooms finished within; the appropriation being insufficient to finish it. In undertaking to do what they designed in the way of repairs and building, the trustees fell into the common error of under-estimating the cost. The repairs on the old building were essential to its preservation, and the new building is no larger than the necessities of the University demand. It is of good architectural proportions, and built in the most substantial manner. While this building remains unfinished, there are the same reasons for keeping the University closed, that there were for closing it in 1858. If students from abroad cannot be accommodated with rooms for study, and there is no provision for lecture rooms, and suitable apparatus, the University, if re-opened, can be nothing more than a mere local school for the benefit of a single city. It was not designed to be such. Its funds were not given for that purpose by Congress, and provision should be made for carrying out the full design of the trust.

I repeat what I said before, the University is not an institution for the benefit of any particular locality. It must of necessity have a location, and will be an incidental benefit to the people in the vicinity; but it belongs to the State,—it is for the benefit of the citizens of the whole State, and they have an interest in putting it in such a condition as will make it a benefit to all. When the University opens next September, as the trustees hope it may, let it not open as a mere local school for boys; but as a well appointed institution of learning, to which young men from all parts of the State may resort; an institution which will recall from the colleges and Universities of other States, the hundreds of our young men, who have been compelled to go abroad to complete their education.

APPROPRIATION ASKED FOR.

From the report of the board of Trustees to the General Assembly, I learn that I am expected to express my opinion as to the means required to enable them to re-open the University in September next. I have already stated what was necessary to be done. After a pretty careful examination I should not differ from their estimate in the aggregate. Fifteen thousand dollars economically expended would be no more than sufficient to complete the new building, finish the repairs on the old, and put it in a proper condition, for the purposes required. Ten thousand dollars was the estimate of the architect, for the completion of the new building, and it is not generally safe to go much below such estimates. But if on account of the reduction, in the price of building materials, this estimate should prove too high, the excess and more than that, could be profitably spent, in addition to the \$5000 asked for, to fit up the old building and to procure necessary apparatus. The old Hall of Representatives, is to be fitted up for a Chapel; the Lecture Rooms are to be provided with seats, and cases are to be made for the reception and safe keeping of the apparatus. Provision is to be made for a chemical laboratory, and when all this is done, there will remain but a very small sum for the purchase of chemical apparatus. The department of chemistry is one of the most important in a State University, for besides affording instruction in that most useful branch of science, it affords the means of analyzing soils, earths and minerals; thus aiding in the geological survey of the State, and helping to develop its resources. A much larger amount than that asked for by the trustees could be expended to advantage, but I am still of the opinion that \$15000 judiciously expended, would put the University in a condition to meet the present educational wants of the State, and render further appropriations unnecessary for some years to come.

If a less sum than this is appropriated, the University will be crippled in its operations, and will be obliged to apply for further aid at a future time. If no appropriation is made, I see not how it can be opened at all, and it must remain closed for three years to come; two years, till at another session of the General Assembly the necessary funds may be granted, and one year after that, until the work can be done. The Trustees have no election in this

matter. There are no funds in their hands which they can legally apply to the erection or completion of buildings. The Constitution of the State declares that the lands granted by Congress shall be for the *support* of the University, and a law of the State restrains the income of the fund to the same purpose.

With respect to the further appropriation of five thousand dollars to replace the money borrowed from the interest fund, I have nothing further to remark, than that the University cannot well spare anything from its capital, nor anything from its funds, which the law designed should be added to its capital. Whether the Trustees had a right to borrow this fund for building purposes, or whether the appropriation of 1858 was expended according to law, it is not for me to decide. The present Board of Trustees have no responsibility in the matter. By the law passed by the Board of Education in December, 1858, the Constitution of the Board was remodeled and an entire new Board appointed. I have never conversed with the members of the old Board, on the subject of the buildings, and know not how they regarded the law under which they acted. I believe, however, from an inspection of the buildings themselves, that the money expended was faithfully and judiciously applied for the benefit of the University. It is all on the grounds in substantial brick and mortar, and when fitted for the residence of students, will be no larger than the wants of the University demand. But if the old Board of Trustees did err in the application of the appropriation of 1858, it should be borne in mind that the Trustees are not the University. They are but the agents of the State to execute a certain trust. They die, but the University survives. Their office expires, or they are removed from it, and others are appointed in their places; but the University remains one and the same. They are individually accountable for the manner in which they execute a trust confided to them, but the University cannot be involved in their acts. To visit upon a public institution the errors of the agents acting for that institution in behalf of the State, would only be multiplying the evil.

UNIVERSITY FUND.

I have one other subject to bring to your notice, and then I shall close. I have already remarked that nothing could be spared from the capital funds of the university. The capital is much

less than that of either of the universities of Michigan or Wisconsin. The capital of our university, in money loaned, amounts to \$110,582 75. In land, to the value of \$62,286 36, making an aggregate of \$172,869 11; which is but little more than half the capital of either of the universities in our sister States. The capital at interest now brings ten per cent., and the gross income at that rate, is about \$11,000, and is sufficient to meet at the present time, the current expenses of the university. But the average rate of interest in the United States is only six per cent, as may be shown from the price of United States stocks. Local causes have hitherto kept the rate higher with us. These local causes will cease to operate in time. Capital will become more abundant, and interest will fall to the average standard. In ten years from this time it will not be safe to estimate the interest of the fund at more than six per cent. Then the whole capital, as now estimated, will produce only \$10,372 14, a less sum than the income at the present time. But the increasing population and wealth of the State, will then demand an institution of learning which cannot be carried on for that sum.

Provision will then have to be made by annual appropriations, or the university will languish, and the cause of education be injured. But it is never safe to depend upon the action of the Legislature, year after year, to sustain an institution of learning. A neglect but for a single year, to make the proper provision, may force its professors to resign, scatter abroad the students, and almost destroy the institution itself. It would take years to recover from such a blow. It has therefore, been always regarded as the part of wisdom, to place as far as possible, the revenues of such institutions beyond the reach of accident, or the caprice of annual legislation, by funding a sufficient amount of capital to secure an ample revenue.

This policy, to a certain extent, has been pursued by our own legislature. It has declared that the lands granted by Congress to the State for literary purposes, shall forever constitute a fund for the support of a State University. If this fund is insufficient to support such an institution, as the interest of the State demands, it would doubtless be prudent to follow the example of our neighbors of Wisconsin, and add to the fund a sufficient amount of any unappropriated lands belonging to the State, to

supply the wants of the University, when its operations shall be enlarged and the income reduced by the reduction of the rates of interest. We are laying the foundation for the institutions of a great State; a State whose greatness will not be delayed for many generations, as is commonly the case, but one which we may confidently hope will, ere this generation has passed away, count her population by millions. A wise foresight, at the present time, might enable us to found, with little expense, institutions of learning, which would adapt themselves to our growing population,—institutions which would amply repay us for their cost, and cause us to be remembered with gratitude, for generations to come. Interest and State pride, and patriotism, and philanthropy, all unite in urging us, on whom devolves the duty of laying the foundations of the institutions of a great State—to lay them broad and deep enough to stand unshaken through all ages.