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# ADDRESS

OF

HON. ALLEN G. THURMAN,

DELIVERED BEFORE THE

Maryland Agricultural and Mechanical Association,

AT

PIMLICO, NEAR BALTIMORE, MD.,

*OCTOBER 8, 1874.*



WASHINGTON:  
S. & R. P. POLKINHORN, PRINTERS,  
1874.

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ROOMS OF MARYLAND AGRICULTURAL AND MECHANICAL ASSOCIATION,  
*S. W. Corner of Fayette and Eutaw Streets,*  
BALTIMORE, *October 8, 1874.*

HON. A. G. THURMAN,

DEAR SIR:—On behalf of the Executive Committee of Maryland State Agricultural and Mechanical Association, I most heartily thank you for the elaborate and instructive address delivered before our Association, this day, and ask for a copy thereof, for publication.

I am, dear sir,

Very truly yours,

A. B. DAVIS,  
*President.*

---

*October 8, 1874.*

DEAR SIR:

In compliance with your polite request, I herewith send you a copy of the Address.

Very truly,

Your obedient servant,

A. G. THURMAN.

HON. A. B. DAVIS,  
*President.*



## ADDRESS.

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To speak of the importance of agriculture would be as superfluous as to speak of the importance of the atmosphere. Man cannot live without air or without food, and the pursuit that furnishes the latter needs no rhetoric to demonstrate its value. Nor would it be much less futile to dilate upon the importance of the mechanic arts; for that which is obvious needs no proof. Were I speaking to barbarians whose inventive faculties had produced nothing but rude instruments of war and of the chase, and the simplest of domestic utensils, it would be well to show them that better works than theirs can be fabricated by the skill of man. But I address an audience acquainted not only with the common implements of husbandry and the arts, but familiar with those wonderful inventions of genius that seem more like revelations of omniscience than productions of the finite faculties of man. To auditors who daily behold the steam engine, the printing press, the electric telegraph, the cotton gin, the power loom, the sewing machine, the reaper and mower, the various smelting and metal works, the flouring, cotton, woollen and paper mills, the elevator, the hydraulic press, the canal and railroad, the sailing vessel and steamship, the photograph and lithograph, the watch, the compass, the level, the sextant, the telescope and microscope, the thermometer and barometer—who are surrounded by the triumphs of architecture and the ever varying and wonderful productions of science and the arts—before such an audience, why should I dwell upon the importance of mechanical science and skill? Every one of you not only knows their importance but

you feel it most sensibly every day of your lives; for they, combined with agriculture, contribute your daily bread, and not that alone but also a multitude of comforts and pleasures that tend to solace the toil of labor and to make life pleasant and desirable. Grateful, then, as the theme would be to the speaker; wide as is the field it offers for oratorical display; agreeable as it would be to you to listen to a beautiful and harmonious discourse upon it, as you would listen with delight to a strain of glorious music, I, who am but a plain spoken man, and by nature and habit an economist of time, must leave it to others more highly gifted by nature and improved by practice, in the pleasing and winning arts of eloquence. But if I do not appear before you as a rhetorician much less do I stand here to-day as a teacher. I see before me hundreds, perhaps thousands, better qualified to instruct me in the arts of agriculture and mechanics than I am to instruct them, and I shall not be so presumptuous as to attempt to teach my masters. I am fully aware of the wonderful proficiency in agriculture achieved by politicians since the Granger movement began,—an acquisition of knowledge whose rapidity has no parallel since the Almighty bestowed upon the apostles the gift of tongues. But as no miracle has been performed in my behalf, my previous ignorance unfortunately remains, and should you see fit to subject me to an examination in either agriculture or mechanics, I very much fear that I should fail to pass, even though your rules were as flexible, convenient and accommodating as those of a civil service commission.

Without further preface, I propose, my hearers, to offer for your consideration some reflections that have no claim to originality, but which may, nevertheless, bear frequent repetition, and to state some facts in relation to our own country that seem to me to be worthy of your attention.



He who has not read and thought upon the subject is likely to be startled at the assertion of profound and learned men, that the oldest pursuit of the human race has been the slowest in its scientific development, and that, although the art of agriculture has been practiced with success for many thousand years, the science of agriculture is of recent origin and dates back but little more than a century. But strange as the assertion may seem, and unwilling as we may be to give it our full assent, yet the more thoroughly and candidly we investigate and study it, the more strongly we become convinced of its probable truth.

The reflections that arise upon a consideration of this fact, if fact it be, instead of being gloomy and despondent are precisely the reverse. Instead of being discouraged by the slow progress formerly made through so many centuries, we naturally say that if agriculture thrived and grew while laboring under the disadvantages of imperfect knowledge and unscientific methods, what must be its progress in the future when aided by the discoveries and application of science, the general dissemination of knowledge and the combined efforts of able, earnest and instructed minds. It is the utterance of a truism to say that the human intellect is limited in its scope, but it is no less true to affirm that in no department whatever of knowledge has it reached its limit. And certainly he would be a most short sighted reasoner who should affirm that agriculture is an exception to the general rule of progress, and that in respect to it there is nothing more to learn. It would be much more philosophical to conclude that old as it is in years it is yet in its infancy.

That the cultivation of various parts of the earth was successfully carried on in very ancient times, is manifest from the historic fact of their great populations, whose food must have been mainly supplied by a productive

agriculture. That it was carried to a very high degree of excellence in Egypt, we learn from history, both sacred and profane. That it was well-known and practiced in India is attested by her wonderful system of irrigation, yet extant, and unequalled in extent in any other portion of the globe.

The most ancient writings of the Chinese, old as they are asserted to be, fail to give us an idea of the remote antiquity of their successful agriculture. We read in the Old Testament of the corn and the threshing floors, the vineyards and the wine presses, the flocks and the herds, nay, of the cattle upon a thousand hills of the Hebrew people.

We find in our libraries Greek and Roman works on agriculture, written before the christian era, and from which instruction may be derived by the most enlightened and skilfull farmer of to-day. What should be the size of a farm ; what its proportions of arable, pasture, meadow and woodland ; what crops and manures are best suited to different soils ; what advantages are derived from open and underground drainage ; when should irrigation be practiced, and what are its results ; what are the benefits derived from land lying fallow ; from deep and frequent plowings ; from a rotation of crops : from turning under green grasses ; from burning the stubble ; are questions, among many, discussed in these works, and which are subjects of yet more elaborate discussion after a lapse of more than two thousand years. Nor was stock breeding and the care and preservation of stock overlooked, and when we read of raising pigeons, not for their flesh merely, but for the very superior manure they furnished, and when we learn how carefully this manure was pulverized, prepared for use by an admixture with earths, and then skillfully and without waste applied, the modern word "guano" almost involuntarily comes to our lips, and we think of the wonders it has

achieved upon many an exhausted field of our native land.

But gratifying as this picture of ancient cultivation may appear, there is another side to it in which it was lamentably deficient. For want of the mechanical invention and skill by which our age is so justly and highly distinguished, the implements of agriculture used by the ancients were so far inferior to ours that could they be produced before you to-day, not all the good they once accomplished could save them from your wonder and ridicule. Here it is that inventive genius and the mechanic arts have contributed directly and most beneficially to promote the cultivation of the soil as we see it practiced in our day, and this is another proof of the universal rule that the benefits of knowledge and skill in whatever department of human effort are not confined to that department alone, but are surely felt, in a greater or less degree, in every other human pursuit.

Another difficulty with the ancients was a want of scientific knowledge. "Science," says Whewell, "is a body of principles and deductions to explain the nature of some matter. An art is a body of precepts with practical skill for the completion of some work. A science teaches us to know; an art to do." Or, as defined by others, science is knowledge, art is the application of knowledge to some useful or ornamental purpose.

An art may be highly productive though some of its precepts be false; but it will inevitably be more productive if all of them be true. And here comes in the great office of science which is to discover and teach absolute verity. And then it is the office of art to apply the discoveries so as to produce the greatest practical results. Science without art is an unused treasure—a diamond buried in the earth. Art without science is work without knowledge—a ship without a compass. It is frequently said

that there is no absolute verity outside of the mathematics, or rather that mathematical truths are the only truths that can be certainly demonstrated; and hence the application of the term, "exact science," to the mathematics. But the observation is entitled to little weight; for there are truths in all the sciences as capable of satisfactory demonstration for all practical purposes as any problem in geometry. For that demonstration is sufficient and may be safely acted upon, that leaves no room for a reasonable doubt. Hence we properly speak of scientific agriculture, meaning a cultivation of the earth in accordance with indubitable principles discovered by science. But a discovery of these principles involves deductions from a vast body of facts that must be collected, studied, analyzed and compared; and it is, perhaps, not going too far to say that this could not be done before the discovery of the art of printing. With the same propriety we speak of mechanical science, or that body of learning that enables the inventor to invent and the artisan to work in obedience to fixed and immutable laws of nature.

What I have just said will suggest some of the reasons for the tardy growth of agricultural science, but there are many others to be taken into the account. The more important of them are admirably stated by Hoskyns in his able introductory essay to Morton's *Cyclopedia of Agriculture*, and I feel that I cannot do better than to briefly repeat the substance of some of his observations:

"Applauded," says he, "from the earliest chronicled ages as the first of arts, agriculture had reached our own, perhaps the least advanced of any, by direct scientific investigation. "*Laudatur, et alget,*" the terse expression of the satirist, might be taken as its truest motto, and its antiquity and importance be asserted in no very triumphant tone; for if both be, as they always have been, admitted, its history compared with that of other arts from

the earliest ages, seems only to present the greater anomaly to the mind of the enquirer. If we trace the progress of what are called the physical sciences, those for instance of astronomy and geometry, from the early days of Egyptian learning, or the history of navigation and commerce from the Phœnicians, the fine arts from the Athenian age, the art of war, Colonial conquest, and civilization, from the Romans, mathematical science from the age of Saracenic conquest, or follow the course of advancing knowledge in Europe, from a point no further back than the invention of printing—it is impossible to escape the unfavorable comparison exhibited by that very pursuit whose universal necessity, while it affords the strongest excitement to progress, might reasonably be expected to have furnished the fullest development of its resources.”

He then proceeds to enumerate some of the causes that “have operated to retard the accumulation of agricultural knowledge,” namely, variety of climate, variety of soil, the geological structure of the earth, difference of elevation, isolation of the farmer, and the length of time needed for experiment, to which it seems to me should be added the prevalence of war, the lack of intercourse between nations, the want of the “art preservative of arts,” printing, the comparative ignorance of geology, mineralogy, chemistry and physiology, and the non-existence of the thermometer, barometer and wonder revealing microscope.

Obviously all these causes operated to prevent that accumulation, analysis and comparison of facts on a grand scale, by which alone great and general truths and principles can be discovered and established.

The cultivator of the rich valley of the Nile naturally felt contempt for regions unfruitful when compared with his own, and without seeking to penetrate beyond the limits of his vision, was content with the knowledge and skill that seemed all sufficient for him.

The cultivator in less favored lands also plied his art according to the local traditional precepts that had been

handed down to him from the fathers, little knowing and little caring what knowledge had been acquired or what modes were pursued in other parts of the earth. And when at length intelligent men began to observe, and to record and compare observations, the field of their inquiries was generally very limited and their conclusions, however valuable in their immediate localities, were often of little or no use elsewhere; and their reflections, however brilliant, acute and profound, served to discover and establish but few rules of general, much less of universal, application.

“The modifications of practice,” says Hoskyns, “occasioned by climate on a large scale have been again parcelled over smaller areas by variety of soil. Not only does the agriculture of a southern temperature vary materially from that of the north, but even in the same country and province the code of practice which would apply to a light soil would be immediately at fault when attempted on a clay: and thus, the geological structure of the earth, again subdivided by difference of elevation, occasioning effects analogous to those of different latitude or climate, would all tend, as we find they have done, to retard that codification of results by which the edifice of a science can alone be reared.”

The isolation of the farmer is the next cause assigned by the writer, and which, before the discovery of printing, operated with far greater force than it does now.

Collision of mind with mind is one of the most fruitful agencies in the acquisition of knowledge, and is indispensable for the correction of errors into which the solitary thinker is so liable to fall. And, therefore, a mode of life that tends to segregate men has been very generally considered a serious obstacle to the progress of science. That this obstacle has been almost overcome in modern times is a cause for profound congratulation, and that one of the chief agents in overcoming it are the Agricultural and Mechanical Associations like that which I now address, is patent to even the most casual

observer. But no such associations, nor anything like them, were known to antiquity. In all that vast body of writings, called Ancient History and Literature, there cannot be found, I believe, a single trace of such an institution.

The next cause assigned by Hoskyns can be best stated in his own words, whose brevity and point cannot be improved. He says:—

“But even under the pressure of increasing numbers, advancing intelligence, and the utmost comparative uniformity of soil and climate, another retarding influence clogs the wheels of agricultural progress: namely, the length of time needed for experiment. A main cause of the brisk advancement and general spirit of improvement observed in other arts and manufactures is to be found in the rapidity with which, in their case, effects follow their causes. The advantage of a simpler or more compendious process is at once seen in result; and the invention is speedily applied by others who are interested in its adoption; but such could hardly be hoped for in the case of an art where each question that we ask of nature takes a year or more for its solution; and upon which no ordinary degree of exact memory, patience and coöperation for experiment, are required, even to put them in such a manner as to render the replies serviceable or conclusive.” \* \* \* \* \*

“Yet, though exalted powers of perception, supported by indefatigable zeal and labor, have enabled individual minds to overthrow and reconstruct the received opinions of mankind in particular departments of human knowledge, this could only happen where the results achieved by intuitive genius or great inventive powers could at once make apparent and attest their own truth and accuracy. A Newton, a Hervey, a Columbus, a Watt, a Davy or a Bacon, might each revolutionize, in the span of a single life, the opinions of mankind, upon the great subjects of their respective inspiration; but it was scarcely within the compass of a single mind to achieve discoveries of corresponding magnitude, in an art whose experiments reach over periods which exhaust human life for their solution, and refer to the whole catalogue of the sciences for the principles on which they depend.”

I have alluded to the prevalence of war as a potent obstacle to agricultural progress. "War and the chase" have been called "the two ancient and deadliest foes to agriculture," and, unfortunately, the history of mankind fully justifies the observation. To say nothing of those great wars of conquest in which whole countries were ravaged and laid waste, and barbarism, or semi-barbarism, supplanted civilization; or of civil wars that banished for the time almost every security of life or property; it would be sufficient to reflect that waste is an attendant of every war however well and humanely conducted; that the rank and file of every army are able bodied laborers withdrawn from productive industry; and that every war, however brief, involves increased taxation, and every modern war an increase of national indebtedness; to see that war is a deadly foe to agriculture. When the taxes levied in a country are no more than is necessary to support a government honestly and economically administered, the people are amply repaid for what they give, by the preservation of order, the protection of persons and property, and the due and proper administration of justice. When the amount levied exceeds this sum, but the excess is wisely expended in permanent works of improvement, the taxpayer has some remuneration, large or small, for his contribution to the State. But when millions, tens of millions, perhaps hundreds of millions are levied, not to defray the ordinary expenses of government, not to improve and enrich the Territory of the State, but to pay the cost of havoc and destruction, then, however just the tax may be, it cannot fail to burthen industry in all its ramifications. No honest people will repudiate their obligations whether of war or of peace, and hence the greater the necessity for cultivating a spirit of harmony and avoiding the dreadful and costly arbitrament of the sword, as long as the honor and interest of the country will permit. But such are



the passions of mankind, and such have been the ambition or folly of rulers, that we cannot point to a single day since the history of the race began to be written, when peace prevailed in every part of the Globe.

That the want of communication between different peoples, and even between the people of different portions of the same country, materially retarded the acquisition of knowledge, is obviously true, and presents a contrast between ancient and modern times so striking as to excite feelings approaching to wonder. In ancient literature we find volumes upon volumes of history, politics, the art of war, philosophy, mathematics, and the drama; and poems whose grandeur and beauty have never been surpassed, possibly never been equalled, by any similar productions of human genius. But, with a few meager exceptions, we look in vain for books of travels; and those we do find are almost, or wholly, destitute of practical, much less scientific, value. But in our day there is no expense too great to be incurred, no hardships too great to be endured, in order to extend our knowledge of even the remotest portions of the globe. Neither the heat of the Torrid Zone or the ice of the Arctic Circle, the hostility of savages or the yet greater dangers of disease, serve to deter our adventurous travellers, who, in the interest of commerce or of science, penetrate every spot accessible to the human foot. The highest mountains of the world have been measured by human science, the greatest rivers followed and explored from their fountains to the sea, the most extensive and barren deserts traversed and described, and almost every island of the ocean, perhaps every one, visited, designated, and marked upon our charts. But what shall we say of the intercourse between the civilized portions of earth; of the thousands of travellers who annually pass from one country to another, for either profit or pleasure, and who return to their homes with an accumulation of

knowledge derived, not from the relations of others, but from their own actual observations. Add to this the changes of residence produced by an unexampled peaceful migration; see hundreds of thousands of hardy emigrants leaving the old world for the shores of America or far distant Australia; witness the multitudes in our own country who annually remove from the older to the newer States, or yet newer Territories; and reflect that each of these emigrants carries to his new home something of the knowledge, both theoretical and practical, of the home he left, and you will have some idea of the vast diffusion of intelligence that necessarily results from these causes. Ancient history presents no such spectacle, nor anything approaching it; for though we read of vast migrations stretching from the mountains and plains of Asia to the shores of the Mediterranean and the Atlantic, the story is always the same—it is of war and of conquest, of havoc and of destruction, of the overthrow of civilization and the spread of barbarism, and not of the diffusion of knowledge, the progress of arts and of science, the improvement of the earth and its greater yield, the bettered condition of the human race and the spread of peace and good will among men.

But it was not in remote times alone that the want of intercourse among the cultivators of the soil was seriously felt. It is felt even to this day, and was experienced in a far greater degree as late as fifty years ago. In an address delivered in 1869, Professor Buckland, said: “I can remember the time when large numbers of English farmers seldom went beyond the boundary of their own county; some even hardly passed the limits of their own or the adjoining parish. What a change has been effected since the introduction of the railway? Farmers may now be seen travelling hundreds of miles to an exhibition, or in company as members of a club paying periodic visits to inspect the practices of distinguished individuals of their craft in different parts of

the country." And he adds with great truth, "A little perambulating of this sort has a most salutary effect in enlarging the farmer's circle of observation, enabling him to gain new ideas, to break loose from traditional prejudices, and to improve his practice by adapting it to the new lights which science and enlarged experience throw across his path."

What is here said of the perambulations of the farmers of England may be repeated, with more emphasis, of our own countrymen; for of all the dwellers upon our planet there are none so addicted to locomotion as the people of the United States. In a country with 13,000 miles of coast along which thousands of vessels ply from port to port; in a country traversed in every direction by navigable streams on which the steamboat is seldom long out of sight; in a country with 70,000 miles of railway in operation and uncounted miles of turnpike roads; in a community of thirty seven States and ten Territories, between which unrestricted free trade exists; with a population whose related members are scattered from the Atlantic to the Pacific—a father, for instance, in Maryland, a son in Missouri, a grandson in California or Oregon, all drawn by natural affection to desire from time to time, each other's society—it is not strange that Americans are by far the greatest travellers in the world. And as to the inducements offered to the farmer, by agricultural and mechanical societies and exhibitions, to leave his home for a brief period each year, and improve his knowledge by discussion, observation and comparison, in no country are they so great as in the United States; for in no other country do such associations and exhibitions abound to the same extent.

But if the friendly personal intercourse of mankind has increased in so wonderful a degree in modern times, the growth of their intellectual intercourse is yet more remarkable and striking. Compare, or rather contrast, the slow and toilsome practice of manuscript writing, by

which facts and thoughts were formerly recorded, with the marvelous product of the steam printing press, and your wonder will be not that the ancients knew so little, but that, with such imperfect means, they learned so much; and you will readily acknowledge that not until the discovery of the art of printing was it possible to get together and compile a grand record of facts and experiments, under different climates, at different altitudes, in different soils, and under a multitude of varying conditions, from which the man of science might deduce general agricultural truths, and without which his efforts would be comparatively vain.

I have thus very briefly and imperfectly remarked upon some of the reasons for the slow growth of agricultural knowledge. But there is one of them which I have only mentioned, about which a word, at least, should be said. "Chemistry," says the *Encyclopædia Britannica*, "as a regular branch of natural science, is of comparatively recent origin, and can hardly be said to date from an earlier period than the latter third of the past century. \* \* From the very nature of chemistry it was impossible that it should take a truly scientific form until the *balance* was applied to it," which was first done by Lavoisier a little more than one hundred years ago. But, in the opinion of many of the ablest writers on the subject, there cannot be, without the application of chemistry, a true and perfect scientific agriculture; and hence Agricultural Chemistry forms a part of the regular course of instruction in all schools in Europe and America, instituted for the purpose of promoting agricultural knowledge. And here it may be well to notice an objection, which though often made and often answered, is yet frequently repeated and perhaps will ever be.

How, says one, can a farmer, engaged from youth to old age in manual labor on his farm, acquire this scientific knowledge, so much vaunted and said to be so ne-

cessary? How can he find time and opportunity to master geology, chemistry, botany and physiology, and apply them in his daily pursuit? And if success in his calling is dependent on his profound knowledge of these sciences, how can he ever hope to succeed? The answer to these questions is plain to him who observes and reflects. Every farmer is not expected to master either of these sciences, any more than he is expected to master astronomy. But it does not follow because every man is not, and cannot be an astronomer, that therefore the truths of astronomy are useless, and Galileo, Kepler, and Newton lived in vain. Every man cannot become a mathematician, but who is there bold enough to deny the value of mathematical science? And so every man cannot become a chemist, but the truths of chemistry may nevertheless prove immensely serviceable to him.

In all the sciences there are numerous principles and results that may be learned and remembered by a little application and that men habitually recognize and act upon without being able to demonstrate the truth of a single one of them. How many ships are safely navigated from continent to continent, in accordance with rules deduced by astronomical and mathematical science, which rules the navigator obeys without understanding the reasons of their existence.

How many artisans shape their works in obedience to geometrical laws who never in their lives saw a demonstration of the truth of those laws. And so when the chemist, botanist or physiologist discovers a truth of value to the agriculturalist, the latter may learn the fact and successfully apply it though ignorant of the process by which it was discovered. We all of us act upon this principle every day of our lives. We take that to be law which the judge declares is law, because we have confidence in his honesty, ability and learning. For the same reasons we take the potion that our physician pre-

scribes, although we know nothing of its elements or the reasons for giving it.

We build a machine in conformity to a drawing furnished by the inventor, and it accomplishes the desired purpose, however ignorant the builder may be of the mechanical laws that make it effective.

In like manner the cultivator profits by the discoveries of science, however small may be his own scientific knowledge. But while I insist upon the obvious truth that it is not necessary that every farmer should be a scientist, I am very far from going to the opposite extreme and asserting that it is immaterial whether he has any scientific knowledge at all. On the contrary, I believe that every intelligent farmer and mechanic unavoidably acquires a large amount of scientific knowledge, and which is none the less science because he may not call it by that name.

And I believe that this knowledge may be largely and beneficially increased without encroaching too much on the time necessarily devoted to manual labor. Science is another name for knowledge, and art, as I have said, is an application of knowledge and skill to produce a desired result. And it is precisely by this combination of science and art, of knowledge and practical skill, that the highest excellence is attained and the greatest results are achieved. I know many intelligent, laborious farmers who may with truth be called scientific cultivators, and many clear-headed, hard working, mechanics, who may, with equal truth, be called scientific artisans; and it is one of the most pleasing and encouraging facts of the age that these classes of men—thanks to the diffusion of knowledge and a higher estimate of the dignity of labor and of the useful arts—are steadily on the increase. And it is by far the greatest merit, gentlemen, of associations like yours that they promote the growth of such men and increase their usefulness from year to

year, nay from day to day. When we reflect that not one farthing can be added to the wealth of the world without the intervention of labor, we must, were we but selfish men, rejoice at whatever tends to elevate the calling, promote the knowledge, increase the usefulness, and add to the comforts and well-being of the laboring man. But there is a higher principle than selfishness that calls upon us to rejoice at his prosperity—a principle of kindness, of benevolence, of humanity; an aspiration for a brighter future, and an increase of happiness for all mankind.

Of the wonderful progress made in the agricultural and mechanical arts within the last hundred years, I have no time to speak in detail. The progressive movement has not been confined to any one country—in a greater or less degree it has pervaded, and yet pervades, the whole civilized world. One hundred years ago there was not a mile of iron railroad on the globe; not a boat, ship or mill propelled by steam; no electric telegraph; no cylinder press; no stereotype; no cotton gin; no steam power loom—the improved plough now in use, the cultivator, the reaper and mower, and the grain elevator, were all unknown, as well as a multitude of other inventions that now lessen or facilitate the labors of mankind.

But these are not the only evidences of rapid and increasing improvement. Some idea of the growing devotion of mind to agricultural studies may be derived from the fact that out of one thousand and thirty-two volumes on agriculture and its closely related arts and sciences, now in the library of Congress, nine hundred and forty were printed within the present century. More than one hundred periodicals, newspapers included, devoted to the same subjects, are now published in the United States alone, not one of which was published before the year 1800. Over one thousand four hundred

agricultural societies and farmers' clubs now exist in the States and Territories, but very few of which existed only fifty years ago, and the number rapidly increases with each revolving year. Agricultural colleges and schools, and mechanics' institutes, are almost everywhere to be found, and no one can foresee a limit to their numbers or usefulness. Thousands of patents are annually granted by the Government for mechanical inventions or improvements, and though comparatively few of them may be either novel or useful, the value of others is universally acknowledged, and the activity of mind and increase of knowledge they display cannot be too highly appreciated. Each census shows an enlarged agricultural and mechanical production; and though, from time to time, it may be retarded by temporary causes, the grand result shows a ratio of increase at least equal to, if not greater than, that of the population. From 1850 to 1860, the increase of population was a fraction over  $35\frac{1}{2}$  per cent. In the same ten years the number of farms increased from one million four hundred and forty-nine thousand and seventy-three to two million forty-four thousand and seventy-seven, being an increase of 41 per cent.; and the area of improved lands from one hundred and thirteen to one hundred and sixty-three million acres, being an increase of over 44 per cent. From 1860 to 1870, owing to the war, the ratios of increase diminished, that of population being only  $22\frac{6}{10}$  per cent., that of the number of farms  $30\frac{1}{10}$  per cent., and that of the area of improved lands  $15\frac{8}{10}$  per cent.—another striking proof of the injurious effects of war upon agriculture. But, nevertheless, there were one million two hundred and ten thousand nine hundred and twelve more farms in 1870, than there were in 1850 and seventy-five million, eight hundred and eighty-eight thousand four hundred and eighty-five more acres of improved land—an increase in twenty years that, under the cir-



circumstances, is without a parallel in the history of the world.

And here I desire to call your attention to another fact of much significance. It is a very general opinion that a subdivision of land into small farms is highly conducive to good cultivation, and we hear the remark frequently made that the farms in the United States are too large.

I do not propose to discuss the question "how minute should be the subdivision of the land," or in other words, "what is the best average size of farms," but I wish to say that the evil of farms of too great size in our country is much less than seems to be generally supposed, and is steadily diminishing from year to year as is conclusively shown by our census reports. Thus, of the whole number of farms in 1860 nearly 41 per cent. were farms of less than fifty acres each; of the whole number in 1870, nearly 50 per cent. contained less than fifty acres each. In 1860, 70½ per cent. were under one hundred acres. In 1870, 78 per cent. Between 1860 and 1870, the number of farms of three acres and under ten was more than doubled; those of ten acres and under twenty increased from 162,178 to 294,607; over 81 per cent. Those of twenty acres and under fifty, from 616,558 to 847,614, equal to 37½ per cent., nearly; those of fifty and under one hundred acres from 608,878 to 754,251, 24 per cent. nearly; those of one hundred and under five hundred, from 487,041 to 565,054—equal to 16 per cent; while those of five hundred acres and under one thousand, decreased from 20,319 to 15,873; and those of one thousand acres and upwards fell off from 5,634 to 3,720. It is thus apparent that the small farms multiply much more rapidly than the large ones, and that the smaller they are, the greater is the ratio of their increase, while the number of the very large ones, instead of increasing, is undergoing a rapid diminution. The economist will

find in these facts some alleviation of his fear that our lands will be too much engrossed, while the statesman, observing how large a proportion of farms are owned by their cultivators, will see in this happy circumstance one of the most powerful conservators of peace, order, freedom and good and stable government.

Mr. President and gentlemen, I am neither an optimist nor an enthusiast, but, despite the clouds that lower o'er our horizon, I think that I can see a future for our country more prosperous and happy than has yet befallen any portion of the human race. I think that I can see more bread for the hungry, more education for the ignorant, more enjoyment for the weary, more respect for labor, a more widely diffused intelligence and a greater material and intellectual progress than the world has yet known. It may be a dream of the fancy, but it is one that I cherish and fondly hope that I may never see dispelled. Should it prove to be reality, one of its chief causes will be the continued growth of those arts whose promotion is the object of your time honored association. And as a grateful posterity will not fail to honor the memories of the men whose intelligence and energy furthered the mighty work, I may safely predict for your society—already so distinguished and so worthy of your great State—that title—the noblest of all earthly distinctions—A BENEFACTOR OF MANKIND.





