

A project to develop U.S. infrastructure

by Pamela Lowry

The following are documents on the project to develop American infrastructure from the Revolution to the Civil War.

George Washington's letter to the Chevalier de Chastellux (1783)

In 1783, as George Washington waited for news of the signing of the Treaty of Paris, he left his military headquarters at Newburgh, New York to embark on a survey of the possible route of a canal which would connect the Hudson with Lake Erie. Determined to link the coastal settlements with the interior beyond the mountains, Washington had, ten years earlier, already lobbied the Virginia and Maryland Assemblies to establish the Potomac Canal Company, which was to make the Potomac River navigable as far west as possible, to link it with the Ohio and Mississippi River systems. Now, with American independence established, General Washington envisioned a system of national waterways which would link the Great Lakes to the Ohio and Mississippi and to the rivers which flowed into the Atlantic.

I have lately made a tour through the Lakes George and Champlain, as far as Crown Point. Then returning to Schenectady, I proceeded up the Mohawk River to Fort Schuyler, and crossed over to the Wood Creek, which empties into the Oneida Lake, and affords the water communication with Ontario. I then traversed the country to the head of the eastern branch of the Susquehanna, and viewed the Lake Otsego, and the portage between that Lake and the Mohawk River at Canajoharie. Prompted by these observations, I could not help taking a more contemplative and extensive view of the vast inland navigation of these United States, from maps and the information of others; and could not but be struck with the immense diffusion and importance of it, and with the goodness of that Providence, which has dealt her favors to us with so profuse a hand. Would to God we may have wisdom enough to improve them.

George Washington's letter to the Marquis de Lafayette (1785)

Echoing John Winthrop's reasons for the Puritan colonization of New England, Washington sets out the motivation for the settlement of the American Midwest.

I wish to see the young people of this world at peace, all

busy and happy in fulfilling the first and great commandment: Increase and multiply. As an encouragement, we have opened the fertile plains of Ohio to the poor, the unfortunate, the oppressed of the earth. All those who are overladen, broken down, seeking a soil to cultivate, may come and find the promised land flowing with milk and honey.

James Rumsey's letter to George Washington on the future of the steamboat (1785)

Sponsored by both George Washington and Benjamin Franklin, millwright James Rumsey worked on perfecting the steamboat while superintending the building of the Potomac Canal locks around Great Falls. The canal project was the most advanced engineering feat yet tried in America, and caused an excitement comparable to that when the Panama Canal was dug more than a century later. Before his two successful steamboat trials on the Potomac in 1787, Rumsey corresponded extensively with Washington on the uses to which the invention could be put.

I have taken the greatest pains to perfect another kind of Boat upon the principles I was mentioning to you at Richmond. I have the pleasure to Inform you that I have Brought it to the greatest perfection. . . . The power is immense and I am Quite convinced that Boats of passage may be made to go against the current of the Mississippi or Ohio River, or in the gulf Stream from the Leeward to the Windward Island, from Sixty to one hundred miles per Day.

Joel Barlow's 'Vision of Columbus' (1787)

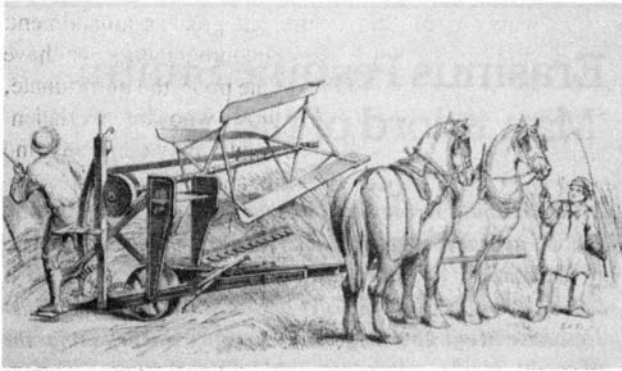
Joel Barlow, future American minister to France, who would sponsor the work of Robert Fulton, published his poem "The Vision of Columbus" in 1787. In this work, Columbus is portrayed as languishing in a Spanish prison, doubting whether his discovery of America has brought any benefit to future ages. An angel appears to show him the future, which includes the following lines:

He saw, as widely spreads the unchannell'd plain
Where inland realms for ages bloom'd in vain,
Canals, long winding, ope a watery flight. . .
Meet the far lakes, the beauteous towns that lave,
And Hudson joined to broad Ohio's wave.

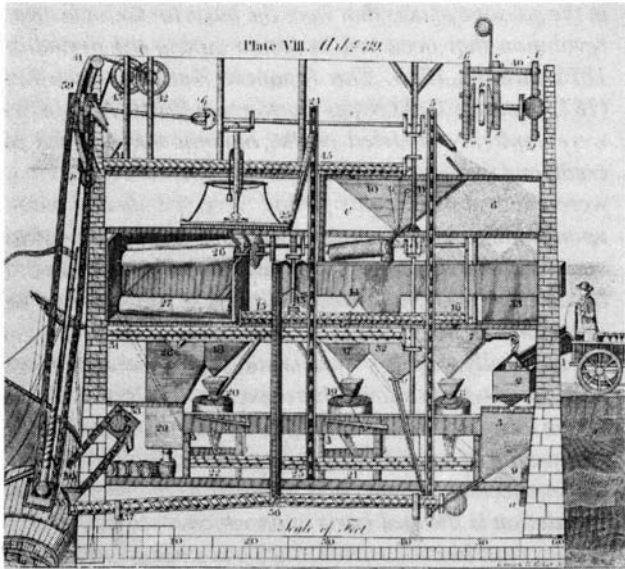
First automobile patent to Oliver Evans (1787)

Oliver Evans, a Delaware wheelwright, invented and built a fully automated flour mill in 1785, the world's first fully automated factory. George Washington became one of the system's licensees in 1791, installing it at his Dogue Creek Mill at Mount Vernon. Evans went on to work on the automobile, railroad, gas lighting, artificial refrigeration, and the high-pressure steam engine.

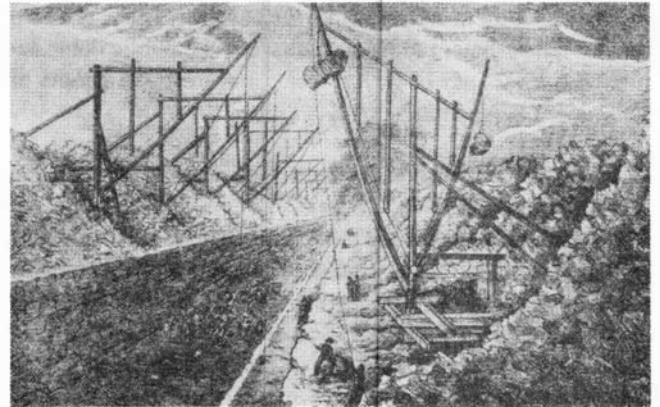
The State of Maryland grants a patent for Mr. Oliver Evans'



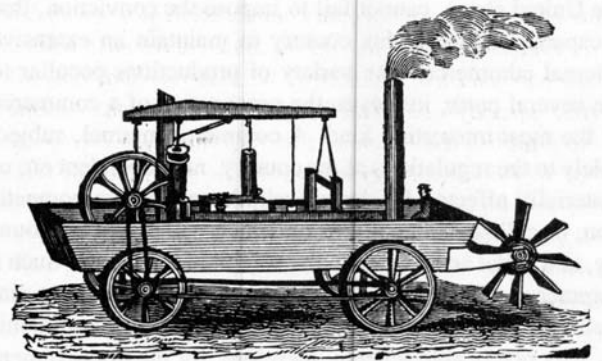
Early reaper.



Oliver Evans's fully automated flour mill.



Construction of the Erie Canal.



The first American automobile (1804), invented by Oliver Evans. It was also used as a steam dredge.

new Plan of applying Steam to Propelling land Carriages to travel with heave Burdens Up and Down Hills without the aid of Animal fource with such Velocity as may be Convenient, and be guided by a person sitting therein Secure from the Inclemency of the weather.

Oliver Evans on the future of railroads (1813)

“Prophecy by the Poet”:

The time will come when people will travel in stages moved by steam engines, from one city to another, almost as fast as birds fly, fifteen or twenty miles in an hour.

Passing through the air with such velocity, changing the scene in such rapid succession, will be a most exhilarating, delightful exercise.

A carriage will set out from Washington in the morning, the passengers will breakfast at Baltimore, dine at Philadelphia, and sup at New York, the same day.

To accomplish this, two sets of railways will be laid so nearly level as not in any place to deviate more than two degrees from a horizontal line, made of wood or iron or paths

of broken stone or gravel, with a rail to guide the carriage, so that they may pass each other in different directions and travel by night as well as by day; and the passengers will sleep in these stages as comfortably as they now do in stage boats. . . .

And it shall come to pass, that the memory of those sordid and wicked wretches who opposed such improvements, will be execrated, by every good man, as they ought to be now.

Oliver Evans on the economic benefits of technological progress (1814)

Evans published a pamphlet for the U.S. Congress, urging it to pass legislation which would extend the term of years allowed for patents on inventions, thus allowing inventors the time to bring their inventions into actual production.

The writer, however, begs leave to declare that he believes that as early in 1786, he himself had conceived and discovered useful improvements, which, if they had been promptly and extensively put into operation, and the savings or gains

by the use of them collected into the public treasury, it would have been sufficient to have discharged the public debt, defrayed the expense of government, and freed the people of the United States from taxes.

The report of the U.S. Senate Committee on Roads and Canals (1816)

The catastrophic results of the War of 1812 demonstrated the folly of the laissez faire attitude demonstrated by Presidents Jefferson and Madison. The American System faction within Congress therefore presented their argument for a dirigist development of infrastructure, a policy which was not to reach complete fruition until the inauguration of John Quincy Adams in 1825.

That a view of the extent of territory, the number and magnitude of navigable lakes, rivers, and bays; the variety of climate, and consequent diversity of productions embraced by the United States, cannot fail to impose the conviction, that a capacity exists in this country to maintain an extensive internal commerce. The variety of productions peculiar to the several parts, invites to the prosecution of a commerce of the most interesting kind. A commerce internal, subject solely to the regulations of the country, not dependent on, or materially affected by the vicissitudes of foreign competition, or collisions; the profits on which will rest in the country, and make an addition to the wealth of the nation. Such a commerce will in its natural tendency, create interests and feelings, consonant with the great interests of the community. Any practicable scheme, therefore, for the improvement of roads and inland navigation, having for its object the encouragement and extension of a commerce so beneficial, has strong claims to the attention and aid of a government, constituted to promote the general welfare.

Such improvement executed on an extensive scale, would unquestionably contribute to the general interest, and increase of wealth in the nation; for whatever tends to accelerate the progress of industry, in its various and particular branches, or to remove the obstacles to its full exertion, must, in the result, produce that effect. The contemplated improvement in roads and canals, by extending the communication for commercial and personal intercourse, to the interior and distant parts of the Union, would bestow common benefits, and give an enlarged faculty to the great branches of national industry, whether agricultural, commercial, or manufacturing.

The agricultural products, which at present from inconvenient distance, their weight, or bulk, are unportable, could then be carried to a distant market; the reduction on the charge for transportation would become an addition to the price; and a ready market, and increased price, enhance the value of the lands, from which the products were drawn.

To insure to the pursuits of useful industry in a nation, a state of the greatest prosperity, it is only necessary to protect

Erasmus Peshine Smith: 'Man is lord of nature'

In 1858, Smith wrote his A Manual of Political Economy (1858) as a means of popularizing the American System of economics, as opposed to the "English economists." In 1871, Smith was officially appointed an adviser to the Japanese Meiji government's Foreign Ministry on issues of credit, tariffs, education, and bilateral treaty arrangements with the western powers. Smith's work was decisive in the passage of acts that were the basis for the industrial revolution that occurred in Japan during the period of 1876 through 1886. The Japanese National Bank Act (1872) and the Gold Notes Conversion Bonds Act (1873) were explicitly modeled on the Hamiltonian notions of credit and national banking. The educational reforms that were enacted during this period were specifically based upon Smith's ideas of creating scientific and technological optimism in a system of universal education that was to become integrally attached to Japanese industry and its development.

Ironically, Smith's work is still in print in Japan and he is more widely known there than in the United States. As his introduction beautifully displays, the idea that the real wealth of a nation comes from the multiplication and the intellectual, moral, and physical development of its population is the real basis upon which a science of economics must be constructed. Such a science is one of hope and progress, rather than the "Dismal Science" of the British apologists of usury and genocide. From the introduction to A Manual of Political Economy:

Starting from the central highlands of Asia—the loftiest habitable region of the globe, where the great rivers take their rise that flow into the Frozen Ocean, and the Bay of Bengal, the Mediterranean, and the Chinese Sea—the human race has descended in an ever-widening flood, to spread over the earth and to subdue it. Sacred history and Hindu tradition point to the same region as the cradle of mankind. They are confirmed by the reflection, that it must have been the first to emerge from the primal waste of waters; and the belief, that here it is that wheat and

their interests from foreign aggression, to leave them unrestrained by artificial provisions, and to remove, or meliorate, the natural obstacles to their exertion, by public works, rendering conveyance practicable and cheap.

Such public works, while they are calculated to subserve the pecuniary interests of every industrious class of the com-

barley are of indigenous growth, and that the animals run wild who have been tamed by man, and have followed him in his migrations through every clime. . . . As the different offshoots of the race descended to the lower tracts that the receding waters gave up to culture, and as each little tribe waxed in numbers, it has taken a higher social organization, with a vast increase in the command of the individual members over the elements of physical comfort, a vast accession to their realized property, and to their power to elaborate yet more from the materials and the forces which nature gives without stint to those who know how to ask her. With diminished toil for the satisfaction of the material wants, and diminished fear of inability to meet them in the future, man has acquired leisure for the cultivation of his intellect, and increased freedom to indulge the social affections, which lift him out of the domain of selfishness, soften and refine his nature, and make it capable of moral improvement. Physical, intellectual, and moral progress, inseparably interdependent, is the historical fact characteristic of our species, and union in societies, its observed condition.

To investigate the laws which explain man's attainment, through association, of enlarged power over matter in all its forms, and the development of his intellectual and moral faculties, in virtue of that power, is the object of Political Economy. . . .

Every accession to knowledge diminishes the catalogue of things thus regarded as outside the pale, within which certain effects are confidently anticipated to result from given causes, and arranges them in relations with each other, no longer imagined and fluctuating, but distinctly seen to be constant and invariable. Knowledge gives power, because when a law is once perceived and understood man can conform to it, for the purpose of producing an effect he desires, by arranging the ascertained causes in that method of grouping which the law dictates, instead of wasting his energies and missing his object, in blind endeavors to obtain it in a way other than that which the Lord of Nature has appointed. . . .

Is it possible to construct a science of Political Economy? In other words, are there laws grounded in the constitution of things and of man, fixed and invariable succession of effects determined by the causes which precede them,—regulating the progress of men in association with

each other, in extending their dominion over matter and their concurrent improvement in intellect and morals?—and are these laws discoverable? What and how many of them have been discovered, is a different question. What is unquestionable is, that there are professors of what is styled a science of Political Economy, teaching in the schools and through the press a body of precepts, tending more or less to the object we have assigned as that of its investigations. On the other hand, it is denied that there is yet such a science. . . .

[The British System] would not, perhaps, be Political Economy such as we have described it. It would be, as it has been called, "the Dismal Science," instead of a science of Progress and Hope. . . .

The strongest instinct of man is that which leads to the increase of population. The European Economists, since Adam Smith, have very generally believed, that the laws of matter were such as to make the repression of this instinct essential to the prosperity of communities. Their system presents a controlling law of humanity as conflicting with the immutable laws of brute matter. It is impossible for them, upon this basis, to construct a science which contemplates the human faculties as acting freely in accordance with their own laws; and to contemplate them as acting under partial and uncertain restraints, is to clog the problem with an insurmountable difficulty. (In reading certain Economists, one might be led to think that the products of industry were not made for man, but that man was made for the products.) If the difficulty is purely suppositious we can proceed with good hope, regarding man as he is, and trusting that we may safely infer the uniformities of the future from the uniformities of the past. . . .

We are to regard man then as the lord, not the slave of Nature, but no arbitrary lord—as acting in accordance with fixed laws of his own being, all of which exercise their due force, and none of which are suspended, any more than the law of gravitation—as securing freedom for that harmonious exercise of all his faculties, in which happiness consists, by means of the intelligence which enables him to apprehend the inevitable necessity that the physical laws must operate, and teaches him how to avoid opposing the irresistible, and how to make it work for him. . . .

munity, are highly important in a political point of view. The citizens, in the most remote parts, would be brought into close connexion, by a facility to commercial and personal intercourse. The common interests and identity of feelings thence arising, would, as a cement to the parts, bind together the whole, with the strong bond of interest and affection,

giving stability and perpetuity to the Union. And as a means of security, tend to increase our capacity for resistance to foreign aggression by rendering less expensive, and more effective, our military operations. The disadvantages experienced, and heavy charges incurred, during the late war, for want of inland navigation along the seacoast, connecting the

great points of defence, are of too recent date, and decisive a character, to require any other demonstration that a facility in inland communication, constitutes a principal means of national defence.

It is believed that improvements so important to the political and general interest of society, stand strongly recommended to the attention of the national legislature. The general government alone, possess the means and resources to give a direction to works calculated for general advantage, and to insure their complete execution.

John Stevens builds the first American steam railroad (1825)

In the winter of 1824-25, the prospects for the full implementation of the American System were never brighter. The Second Bank of the United States had been chartered in 1816, the Survey Act of 1824 allowed the government to loan West Point engineers to infrastructural projects, and John Quincy Adams was about to be inaugurated as President of the United States. To give a sharp impetus to the building of railroads, inventor John Stevens built a half-mile circular track in his backyard at Hoboken, New Jersey, and, at the age of 76, fashioned with his own hands the first steam locomotive in America. He invited ladies and gentlemen from New York to take a ride, and whisked them around the track at six miles an hour.

Stevens, one of the three original patent holders for the steamboat, had early lobbied Congress for federal patent laws that would protect advancements in steam transportation:

It is evident that from a reciprocal exchange of the production and manufactures of one country for those of another a general advantage would result to the whole. The earth would then be everywhere stimulated to bring forth with its utmost vigor; civilization and the arts would spread rapidly over the face of the globe; then, and not till then, might it be said that man was really the master of this world, with everything in it subservient to his will.

In 1813, Stevens had written to the Erie Canal Commissioners, encouraging them to build a railroad rather than a canal. This statement, written long before there was even one functioning railroad anywhere in the world, has been called "the birth certificate of all railroads in the United States."

So many and so important are the advantages which these States would derive from the general adoption of the proposed railways that they ought, in my humble opinion, to become an object of primary attention to the national government. On the success of an experiment, a general system of internal communication and conveyance should be adopted, and the necessary surveys made to embrace and unite every section. It might then, indeed, be truly said that these States would constitute one family intimately connected and held

together in indissoluble bonds of union.

The revenue which this mode of transportation would be capable of producing, would far exceed the aggregate amount of duties on foreign importation. It is an indisputable fact that the aggregate of annual interstate commerce is vastly greater than that of external commerce. The farmer would save four-fifths of his present expense in transporting his produce to market. Innumerable ramifications would be extended in every direction. The sources of private and public wealth would increase with a rapidity beyond all parallel.

There remains another important point—celerity of communication—a consideration of the highest moment. If the Proas of the Pacific can be driven at twenty miles an hour by the wind, I can see nothing to hinder a steam-carriage from moving with a velocity of one hundred miles an hour."

Capt. Basil Hall visits the infant city of Rochester, New York (1827)

Infrastructural projects such as the Erie Canal unleashed an unprecedented wave of city-building. The spirit of nation-building was reflected in the comments of a West Point cadet to an English visitor: "We must get up early, for we have a large territory; we have to cut down the forests, dig canals, and make railroads all over the country." Retired Navy Capt. Basil Hall, a native of Edinburgh, Scotland, provides an account of the pace of that development.

On the 26th of June 1827 we strolled through the village of Rochester, under the guidance of a most obliging and intelligent friend, a native of this part of the country. Everything in this bustling place appeared to be in motion. The very streets seemed to be starting up of their own accord, ready-made, and looking as fresh and new, as if they had been turned out of the workmen's hands but an hour before—or as if a great boxful of new houses had been sent by steam from New York, and tumbled out on the half-cleared land. The canal banks were at some places still unturfed; the lime seemed hardly dry in the masonry of the aqueduct, in the bridges, and in the numberless great saw-mills and manufactories. In many of these buildings the people were at work below stairs, while at top the carpenters were busy nailing on the planks of the roof.

Some houses were half painted, while the foundations of others, within five yards' distance, were only beginning. I cannot say how many churches, court-houses, jails and hotels I counted, all in motion, creeping upwards. Several streets were nearly finished, but had not as yet received their names; and many others were in the reverse predicament, being named, but not commenced,—their local habitation being merely signified by lines of stakes. Here and there we saw great warehouses, without window sashes, but half filled with goods, and furnished with hoisting cranes, ready to fish up the huge pyramids of flour barrels, bales and boxes lying in the streets. In the centre of the town the spire of a Presbyterian

church rose to a great height, and on each side of the supporting tower was to be seen the dial-plate of a clock, of which the machinery, in the hurry-skurry, had been left at New York. I need not say that these half-finished, whole-finished, and embryo streets were crowded with people, carts, stages, cattle, pigs, far beyond the reach of numbers;—and as all these were lifting up their voices together, in keeping with the clatter of hammers, the ringing of axes, and the creaking of machinery, there was a fine concert, I assure you!

Thomas P. Kettell on the development of American railroads (1859)

Although the Jacksonians launched a full-scale attack on the American System, canceling the charter of the Second Bank of the United States in 1833 and revoking the Survey Act of 1824, the American dirigist faction found ways to keep infrastructural development on track. West Point engineers resigned from the U.S. Army in order to design canals, railroads, and harbor improvements. States invested their own funds in railroad development. And the federal government used its vast store of federal lands beyond the Allegheny Mountains as capital for financing infrastructure projects.

By the eve of the Civil War, the United States possessed a comprehensive railroad network, commented on here by Thomas Kettell, the editor of the Merchants' Magazine and author of various economic statistical works.

The great object of the railroad companies has not been so much to derive a direct profit from the investment, as to cause the construction of a highway, which should by its operation increase business, enhance the value of property, and swell the floating capital of the country by making available considerable productions of industry, which before were not marketable, since the influence of a railroad in a new district is perhaps if not to create, at least to bring into the general stock more capital than is absorbed in its construction.

The grand result is over 28,000 miles of road, which have cost, in capital and funded debt, \$1,066,866,284, which has been expended in the period since the first road was begun. The expenditure of such an enormous sum of money, amounting to \$54 per head for the average population during the 30 years in which they have been building, is marvellous in so young a country, which, 40 years before this outlay occurred, was mostly destitute of capital. The railroads, however, exist, and capital is now, at this moment, more abundant for general purposes than it was before the construction of the railroads. It is, in fact, cheaper in the general market, and in this we recognize the vast utility of the works in developing capital.

Charles L. Flint refutes malthusian theory (1859)

Charles Flint, the Secretary of the Massachusetts Board of Agriculture, provided a section on agricultural improve-

ments for a book entitled Eighty Years' Progress of the United States. After describing the vast increase in the powers of labor effected by the invention of agricultural reapers, balers, and threshers, Flint throws the result in the teeth of Parson Malthus and his British System adherents.

These vast and acknowledged improvements in harvesting and threshing grain will be seen to be of the utmost importance, when it is considered that we annually raise about two hundred millions of bushels of wheat, and of rye, barley, and oats over one hundred millions, and that the resources of the country may be developed, by the use of machinery, to an extent far beyond the reach of present calculation.

The reaper, the thresher, and the mower are types of the ever restless and progressive spirit of the age. They point out to us a glorious future, in which they will accomplish for us and for our country triumphs grander than the triumphs of arms, for they will develop the means of supporting the millions of human beings which the implements of war can only destroy.

Could the learned Malthus—who proclaimed the gloomy theory that war, famine, and pestilence were checks, designed by an all-wise Being to keep down the increase of population to a level with the means of sustenance—now rise up from his sleep of death and see the population of England more than doubled since his day, and that of this country multiplied many times, while the people are better fed, and better clothed, with less labor and less suffering, with the possibility of a famine wholly and forever removed, he might change his shameful doctrine, and adopt a more cheerful and hopeful view of the providence of God. With an immense multiplication of the human species in all civilized countries which have been devoted to the arts of peace and the development of their material resources, a bountiful Father has sent us a superabundance of food, instead of famine, and has taught us to rely on the exhaustless bounty of the fruitful earth, and upon his beneficent promise that seed time and harvest shall never fail to supply the daily wants of his children.

But with all the progress which we have made in improving the implements of the farm, we have not reached perfection. No bound is set to human ingenuity, and further means may yet be devised to shorten labor and increase the products of the soil.

We cannot hope, nor is it desirable, to avoid labor. This is not the object of improved machinery; but to make labor more attractive, agreeable, and productive; to bring into subjection the rude forces of nature, and make them do our bidding and increase our stores; to redeem thousands of acres now lying waste from wildness and desolation, and to make our country the granary of the world—these are triumphs we may hope to gain from the introduction and use of improved machinery, and in this view the subject commends itself to the attention of the highest intellect, and opens a field for the labors of the noblest philanthropy.