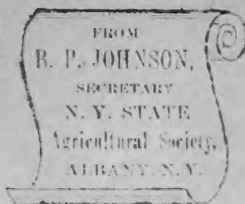


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ADDRESS

DELIVERED BEFORE THE

N. Y. STATE AGRICULTURAL SOCIETY,

At Albany, October 7, 1859,

BY JOHN A. ^{*dams*} DIX.

THE UNIVERSITY OF CHICAGO

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ALBANY:
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ADDRESS

the President of the Society of Friends
Twelve years ago I had the honor to appear
before the Society at one of its annual exhibi-
tions in a neighbouring county, under the name
of a person of a peculiar character. I did not know
then and I do not to present any views or state
any conclusions of my own in regard to the great
subject to which your labors are devoted, but
to perform the various services of visiting to the
the address prepared for the occasion in your
Wentworth Street, I do not think I should
well that the address was written by an author
whom I had never heard of, and who was
not known through the medium of any
good name of acquaintance, but whose name
I had only heard of through the medium of
the press, and standing in a position of
obscure and insignificant name, I had
been able to bring into the public view
the address which I had the honor to

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ADDRESS.

*Mr. President, Ladies, Gentlemen of the
Society, Fellow-citizens:*

Twelve years ago I had the honor to appear before this Society at one of its annual exhibitions in a neighbouring county, under circumstances of a peculiar character. I did not come then, as I do now, to present any views or state any conclusions of my own in regard to the great interest, to which your labors are devoted; but to perform the vicarious service of reading to you the address prepared for the occasion by SILAS WRIGHT. Most of you, I do not doubt, remember well that the address was written by its distinguished author during the intervals of agricultural labor through the summer harvest—not the mere labor of superintendence, but earnest and thorough field-work, with the scythe, the rake and the hay-fork, standing side by side with his laborers, and measuring his own strength with theirs. A few hours after the closing lines of the address were written, he died suddenly of an

affection of the heart. They were, probably, the last lines traced by his pen ; and there is no doubt that the sudden termination of his life is to be ascribed to the equally sudden change of his habits—from the sedentary occupations of twenty years in court-rooms, executive bureaus and legislative halls, to the hard labor of a farm. It might, at first glance, seem more in harmony with the tenor of his public career, if he had fallen in the Senate chamber—the theatre on which his distinction was chiefly earned. But those who know how little he prized public office and its honors, how much more he loved the quietude of the country and the occupations of rural life, cannot but regard the closing scenes of his earthly pilgrimage as peculiarly in accordance with the tone of his thoughts, the simplicity of his character, and his devotion, throughout his whole official career, to the cause of productive industry.

It is no small distinction to the agriculture of the country and the State to have numbered among its followers a man of so much talent and purity. If it had been in the order of Providence that he should have lived to attain the highest political honors of the republic, his incorruptible integrity, his conscientiousness, his firmness, and his thorough acquaintance with the details of

public business must have told with great effect upon the administration of our national affairs, by checking extravagant expenditure, correcting abuses, and giving steadiness to the movement of the government in critical emergencies; and at the close of his labors he would have returned with the same simplicity and unaffected zeal to the cultivation of his farm.

I have not alluded to this subject for the mere purpose of paying a tribute of respect to the memory of a departed statesman, peculiarly connected as he was with the cause of agriculture, and with the proceedings of this Society; but as an appropriate introduction also to the principal subject of his address—the importance of the foreign grain and provision market to the farmers of the United States.

Twelve years ago this subject was scarcely deemed worthy of a place in our schemes of domestic economy; and it is one of the strong evidences of Gov. Wright's sagacity and forecast that he should have made it the leading topic of discussion in his address. Indeed it had acquired, at the time he was discussing it, an importance of which he himself was not aware. Our exports of breadstuffs and provisions in 1846 were a little less than \$28,000,000. In 1847, they rose to

nearly \$79,000,000 ; but at the time he was preparing his address the statistics of the year had not been collected and published.

During the last fifteen years these exports of our agriculture have made a great though not a steady advance, and it may be safely assumed by agriculturists that there will be a constant demand in the European markets for the products of their industry—a demand as uniform as the varying productiveness of different years abroad will admit. I think it may be stated as a proposition from which the farmers of the country may draw conclusions, and by which they may be guided in their practical operations, that Europe cannot raise a sufficient amount of food for the consumption of its increasing population, and that even with the most abundant harvests there will be an annual deficiency, which can only be supplied by the United States.

This whole subject has been treated with great ability by Mr. John Jay, of the city of New York, in an address on the Statistics of American Agriculture before the American Geographical and Statistical Society ; and I shall draw largely from the materials collected by him in support of the proposition I have stated.

It is well known that in most of the principal

states of Europe, and nearly all the minor, the increase of population, though small in proportion to the rate of increase in the United States, is greater than that of the means of subsistence. In old and thickly settled countries, it must, of necessity, be so. The best lands having been long under cultivation, poorer soils must be resorted to as population increases, and with it the demand for food; and the difficult question always arises (a question only to be settled by experiment,) whether the products of these soils will be equal to the increased demand for them; or, in other words, whether the whole labor of the additional population can extract from them a supply of food sufficient for its subsistence? This question may be considered settled, not only in Great Britain, but in most of the countries of central and southern Europe. The conclusion has been manifesting itself for years in practical, and not always the wisest measures, to remedy an inconvenience felt, rather than accounted for by any rational investigation of its causes,—sometimes by the prohibition of the exportation of breadstuffs, and at others by the imposition of duties on foreign grains to protect and stimulate domestic production. In the meantime the deficiency has been continually increasing, and large masses

of people have been supported by constantly diminishing amounts of food. France, as a nation, has not enough to eat. It is estimated that four millions of her inhabitants do not eat bread. The vine, an exhausting crop, which gives back to the earth none of the nutriment extracted from it, takes an immense extent of surface from the production of grain, and in central and southern Europe, as well as in France, is annually increasing the necessity for supplies of foreign breadstuffs. In the last named country, too, the cultivation of the beet root for the sugar manufacture has reduced the surface for the production of grain; and, on a recent occasion, the Emperor found it necessary to allow its free importation from other countries. In England, the deficiency of breadstuffs has become still more apparent; and though she exported largely a century ago, she is now a large importer, and her inhabitants cannot be subsisted on what she produces. She may be considered, from the density of her population, as having nearly, if not quite, reached her maximum capacity for production; and the one thousand people added every day in the year to the number of her inhabitants, must be subsisted by imported food.

This increasing demand for food in Europe has

been largely supplied by us. During the last eleven years our exports of breadstuffs and provisions have averaged over \$47,000,000 per annum; and of the exports of 1847, over \$55,000,000 went to Europe. Their increase will be better understood by comparing the last seven years with the preceding seven. During the former period they averaged a little over \$31,000,000, and during the latter nearly \$50,000,000. The average of 1856 and 1857, was over \$75,000,000. In 1858, we had, in some of the large wheat-producing States, a short crop, and the exports of the year may show a diminution. Fluctuations in the amount of agricultural exports are unavoidable. A deficient crop in any country necessarily limits its ability to export—as it can only part with the surplus which remains after supplying its own people. This inability in the countries of Europe to supply their own inhabitants with food, the certainty that it must become greater as population increases, and the assurance that it can only be met by the products of our own agricultural industry, make the subject one of the most interesting and important that can engage the attention of the American farmer and statesman. It concerns the prosperity and the

progress of the country for centuries to come, and its exemption from any serious or lasting disturbance of our friendly relations with European powers. No country can afford to quarrel with another, from which it derives the means of subsistence. Nor can the country which furnishes the supply afford to part with its valuable customer. There is every reason, therefore, to expect that questions of dispute will be discussed and adjusted in a spirit of mutual forbearance; and where such a spirit exists, there can be no long continued alienation.

To you, gentlemen, as a part of the agricultural interest of the country, the question presents itself under a variety of the most important aspects. Can the production of food in this country be made to keep pace with the European demand for it? In other words, can the additions to be annually made to the population of Europe be sustained by the export of our agricultural products? This is a great question of political economy, which may be elucidated by theory, but the answer to which the farming interest of the country must work out in practice.

There is certainly no country better adapted than ours to become the granary of the world. It occupies the most favorable portion of the North

American continent for production, neither running up to the regions of severe cold on the one hand, nor to those of excessive heat on the other. It is the great temperate district of the western hemisphere, and yet so extensive as to embrace every variety of vegetation, which does not require the stimulus of intertropical heat. Navigable rivers, almost unequalled in the surfaces which they water, are so many great natural channels for conveying our products to the Atlantic Ocean, which has, within our limits, a coast of nearly seven thousand miles in extent, affording extraordinary facilities for commerce. A few hundred miles back from the coast a range of mountains, with a mean altitude of 2500 feet, runs from north to south, and in the more heated districts furnishes on its slopes the mitigated temperature which arises from elevation. Our territorial area, including California and Oregon, is nearly 3,000,000 of square miles—a larger surface than that of Russia in Europe. British America has a little over 3,000,000, but a large portion is locked up in hyperborean frost. Taking the Atlantic district, from the Gulf of Mexico to the Lakes, with the vast territory drained by the Mississippi and its tributaries, embracing altogether a surface of nearly 2,200,000 square miles,

and I believe it may be safely said that there is no region on earth of the same magnitude, which has an equal capacity for production. With the exception of New England and the middle States, there are in every portion of this extended district large quantities of the most fertile land, which the hand of agriculture has not yet touched; and I believe it may also be said that there is no portion, of any considerable extent, which is absolutely unproductive. Of the Pacific district we know little, except from the constant tide of treasure, which for ten years has been setting into our Atlantic cities. Enough, however, has been gleaned from the hasty and imperfect explorations which have been made, to assure us that over this great district the richest fields of grain are hereafter to wave, and that numberless herds of cattle are to range through meadows and over mountain slopes clad with grasses unsurpassed in luxuriance. There is a great district, spreading out from the eastern slope of the Rocky Mountains, which nature, it is said, has consigned to perpetual barrenness. Scientific observations seem to warrant this conclusion. But let us not decide too hastily. I remember when it was asserted, on the basis of actual exploration, that there was only fertile territory enough between

the Mississippi and the Rocky Mountains for four States of the size of New York ; and yet a surface vastly more extended is now occupied under State or Territorial governments, and promises to rival in productiveness the richest soils in the Union. We all remember that it was demonstrated on principles of natural science that the Atlantic ocean could not be navigated by steam. And yet, in a few years afterwards, steamers were regularly crossing it, with voyages averaging from ten to fifteen days, and they are now so multiplied that they threaten to supersede sailing vessels in carrying on the commerce of America with Europe. Science never fails to give the true solution of a problem, if it is in possession of all the elements which belong to it. It may be that there are elements of production in the region referred to, which have escaped observation, and that it may, at least, be found, as I believe it will, to be much less extended than is supposed.

I have thus briefly alluded, gentlemen, to the physical characteristics of the immense region over which dominion has been, in the order of Providence, given to you and your fellow countrymen. It is the noblest inheritance ever bestowed by the Sovereign Ruler of the Universe

on any race of men that has inhabited the earth. We possess it, too, under advantages which no other people ever enjoyed. Our independence as a nation was almost coeval with the new impulse given to the natural sciences by the genius of the old world. They have in our own day reached a point from which there seems to be little left to be accomplished in the future, except through the application of established principles. We know the elementary substances which enter into the composition of organized and unorganized bodies. There is nothing we deal with, of which we do not know the nature and the characteristic properties. We understand, in all its intricacies, the marvelous mechanism of the human constitution—all but the ethereal spirit which animates it, and the knowledge of which alone, as an emanation of the Divine essence, the great Creator reserves to himself till the fullness of our time shall come. During the last few years, natural science, which had expended its labors on astronomy, chemistry, geology, and the mechanic arts, has been turned to the great field of Agriculture. It has analyzed soils and disclosed their constituents; it has taught us the composition of plants, the nature of the food they require, and the degree in which they extract

from the earth its principles of fertility and impair its capacity for their reproduction.

It is thus armed that we are entering on the great work of subduing the untamed soils of the western hemisphere, and making them yield what is needed for our own sustenance and for the unfed multitudes of the old world. I say we are just entering on this work, for only about one-thirteenth part of our vastly extended territory is under cultivation. Small as this portion is, I fear but little of it is improved as it should be. Our whole system of agriculture has been one of gradual spoliation. The soil, which we should have at least preserved unimpaired in fertility, has been rapidly deteriorating in our hands. The southern planter has been in the habit of extracting crop after crop of tobacco and corn from his lands, and when they had lost all capacity for production, of abandoning them, and emigrating, with his negroes, to new soils. The northern farmer has done the same thing, not without some feeble attempts, perhaps, in most cases, to keep up, by rotation of crops, the average fertility of his land; and multitudes, who have emigrated from the east, are carrying on the same process of exhaustion on the prairies of Illinois, Wisconsin and Iowa. I was last spring

in a city in one of these States, on the Mississippi, and found the inhabitants throwing their manure into the river. I enquired the cause of this extraordinary practice, and was told, in reply, that their lands were naturally fertile enough without artificial aid. A few years will bring with them, as time has everywhere else, the penalties of wastefulness, in diminished crops and lighter grains. The annual loss in the United States, from the abuse of the soil, is to be computed not by millions of dollars, but by hundreds of millions. We know from statistical facts that the average production per acre has greatly diminished. In this State, less than a century ago, the average wheat crop was over twenty-five bushels per acre. It is now about twelve. In Ohio, one of the most fertile States in the Union, and but little more than half a century old, the average is about the same as in New York. The virgin soil is already half worn out. In some of the Southern States the deterioration has been more rapid, and the average production is still less. These are the legitimate fruits of careless systems of husbandry. They are not merely careless—they are systems of the most wasteful and culpable extravagance. The man who extracts from his land all it is capable of

producing, without giving back to it an equivalent in fertilizing substances, is in fact selling his farm in his crops. It is precisely the system of the prodigal, who spends his money capital, instead of living by a prudent economy on the interest. It was the same system of spoliation which exhausted the grain fields of Imperial Rome. Cato, more than two thousand years ago, and Columella, Varro, and Virgil, at a later day, wrote learnedly, and some of them gracefully, on the subject of agriculture. They laid down the most unexceptionable rules in regard to rotation of crops, the cultivation of plants, the treatment of the soil, and all the leading subjects of practical husbandry. But the agriculture of Rome died out under their precepts, and the desolation of the campagna, once the prolific mother of nations, and now to a great extent overrun with noxious vegetation, and made uninhabitable by pestilential exhalations, attests the insufficiency of their systems. The Maremma, in ancient Etruria, was exhausted by the same process of spoliation; it became nearly uninhabitable, and, like the campagna, exhaled an atmosphere of pestilence and death. But by the persevering efforts of Leopold the First, of Tuscany, against

great physical impediments, a large portion of it has been reclaimed and made healthful and productive. The ancients labored under disadvantages, which time has removed. They had no knowledge of the natural sciences, which are the offspring almost of our own generation. Analytical chemistry has taught us the component parts of the soil, and of the plants and grains which it produces. We know precisely the amount of each organic and inorganic element, which is lost to the earth in bringing a certain quantity of grain to perfection. We know that unless these elements are restored, the earth is robbed of so much of its vegetative power, and gradually becomes worn out and unproductive.

I have dwelt upon this subject, gentlemen, because it is the great danger which threatens our agriculture, and which we must guard against by timely reform, if we would fulfil our destined work of supplying the increasing wants of the Eastern hemisphere. I desire to give it prominence, because I believe there has been no instance in the history of our race in which the fertility of the earth has been so rapidly wasted. It would have been otherwise, no doubt, if we had not been able to resort to boundless tracts

of fertile land in the West, which were open to emigrants at prices almost nominal. It was thought easier to wear out old lands and remove to new than it was to keep up the fertility of the old by manuring. It was a fatal error, as the condition of our agriculture shows. But for the extraordinary productiveness of the western States and Territories, the old States would, at this very moment, have been dependent on other countries for their supplies of food. The remedy for all this evil is in our own hands. It is to restore to our lands, by manuring, what we take from them in crops. We all know that this process of restoration has been going on for nearly a quarter of a century in Virginia, and that lands which had been worn out by successive crops of tobacco, corn and wheat, have been reclaimed and made to produce abundantly. It is estimated that thirty millions of dollars were added in value to the agricultural capital of that State, in twelve years from the commencement of this process of reform. The same results would follow the same measures in all cases in which the powers of the soil have been overtasked; and it is not doubted by those who have closely investigated the subject, that the crop of Indian corn might be trebled without

enlarging the surface on which it is now cultivated, and that millions of dollars might be added to the annual value of that crop alone. Nor can it be doubted that the production of the other great staple articles of food might be augmented in a like proportion, increasing enormously the wealth of the country, and furnishing larger surpluses for exportation.

But it is time, gentlemen, that I should dismiss this general topic and turn to others which more directly concern the agricultural interest of New York. Let me, before leaving it, return to the proposition with which I commenced, and make a single additional observation in support of the concluding part of it,—that the increasing deficiency in the production of food in Europe can only be supplied by the United States. The remark I wish to make is this—that while labor is more abundant and cheaper in Europe than it is in the United States, we have three advantages which give us, and will give us for years to come, a decided superiority over the countries of the Eastern hemisphere.

1st. An immense region, unsurpassed in fertility, yet to be occupied.

2d. A more intelligent laboring community, constantly improving through the influence of a

free and cheap press, and a social organization, which not only secures to every citizen the enjoyment of the fruits of his industry, but gives him a direct voice in the choice of his own rulers ; and

3d. The great extent to which machinery is employed in agriculture as a substitute for men, counterbalancing largely the advantage of cheap labor in Europe.

I do not venture to make an estimate of the extent to which mowing-machines, reapers, and other substitutes for manual labor have superseded the latter in the cultivation of the soil in this country ; but I believe I am within bounds when I say that it is equivalent to five millions of men. These advantages must give us, in the competition for the European grain and provision market, a superiority over all other countries, and will make us, if we husband our natural resources with ordinary prudence, the granary of the World.

In leaving the general topic which I have discussed, and limiting our view to the State of New York, we cannot fail to be struck with the advantages which our farmers and agriculturists possess. First of all, we have, within our own boundaries, the emporium of the country,—not only destined,

in all probability, to remain for centuries, the principal commercial city of the Union, for export, import, and distribution, but also to become the grain market of the World. It is a matter of the highest importance to our farmers to be so near the chief point of export and import, not merely because the expense of transportation is usually in an inverse ratio of distance; but because great marts are always cash markets, and from the magnitude of their operations, and the accumulation of supplies for all the wants of men, they furnish readily, and at the lowest prices, all that the agricultural classes demand, in return for the products of their labor. Thus, the agriculturist is always sure of selling for cash his surplus produce, and of buying what he needs at rates which an extended and active competition is certain to reduce to the lowest standard. Artificial communication has greatly added to the value of this privilege. With the exception of a few sequestered localities, and these of very inconsiderable importance, the city of New York may be reached in twenty hours from the remotest district in the State.

The capacities of the State for agricultural production, arising from variety of soil, unequal elevations of surface, and diversity in the geolo-

gical formation of different districts, may be favorably compared with those of any other State in the Union. A geographical district having throughout the same geological formation, and relying almost exclusively on a single class of productions, is much more in danger of suffering from unfavorable seasons than one, which, from the diversity of its surface, is enabled to apply its labor to a variety of products. In the former the failure of a crop may produce general distress, while in the other it would only be the cause of a partial inconvenience.

In the final report of the geological survey of the State, it was divided, with reference to its physical constitution and agricultural capacities, into six great districts; but, in a comparison of soils, on the basis of productiveness, they were reduced to five. Let us glance hastily at some of these divisions.

The western and central district, extending from the Mohawk to Lake Erie, and embracing all the intermediate counties, is in reference to the great staple production, wheat, the first in importance. Though the average product is much lower than it was when the soil was first reduced to culture, it is still over fifteen bushels per acre, and, in this respect, has main-

tained its productiveness better than any other portion of the State. One reason unquestionably is, that it is the most recently settled. But there is, probably, another cause to be found in the geological constitution of this district. It is underlaid in some portions by the Medina sandstone, rich in marls, and in others by shales and limestones, which, for the most part, disintegrate rapidly under the influence of atmospheric agents and resupply to the soil the mineral elements removed by the cultivation of wheat. It is in this point of view that the western and central district of New York may be regarded as one of the most reliable wheat-growing regions in the United States, and likely, with proper treatment, to remain so in all future time.

The great wheat-growing districts of the Union consist, for the most part, of prairies in the western States and Territories, some of which have been for centuries denuded of trees, and have yielded little else than grasses, by the decaying remains of which the soil has been constantly enriched. But whether with or without timber, the surface soil of these great plains is much the same. It is composed of the carbonaceous remains of decayed and decaying vegetation, and is usually of a depth, which, to persons unacquaint-

ed with the principles of vegetation, and their influence on the soil, would seem to give it an exhaustless fertility. It is for this reason, that the first cultivators have gone on, year after year, carrying away the produce of the land without giving anything back to it in compensation for the organic and inorganic elements which have constituted the food of the plants they have removed. The result has been everywhere the same. The crops have steadily deteriorated in quantity and quality. Experience has shown the expectation of undiminishing productiveness in new soils, no matter how fertile, to be a gross delusion. Science explains the cause of the deterioration. Vegetables, like animals, are developed by means of the food they consume. The former draw their sustenance directly from the earth. Every crop reduces the quantity of food the earth contains, and diminishes the conditions of its fertility; and, after a certain period, the capacity of the earth to produce the same crop ceases. In other words, the supply of food which the crop requires for its production becomes exhausted. There is but one mode of guarding against this result, and that is by restoring to the earth the same amount of organic and inorganic matters

which have entered into the organization of the crops removed. This is the universal law of compensation in every department of physical life. Chemical analysis shows that plants contain the same principal ingredients, in very different proportions. It shows, also, that soils, apparently similar, vary essentially in their chemical components, and that while one is better adapted to wheat, another contains in more suitable proportions the mineral substances required by other grains. If the cause of the deterioration of the wheat crop in this State could be ascertained, it is probable it would be found that the soil on which it has been cultivated possesses, in a reduced proportion, one or more of the mineral substances essential to the growth of that grain, and that if the deficiency were supplied the soil would possess the original fitness for its production. It is not probable that the counties on the North river and its vicinity will, for a long course of years, if ever, return to the cultivation of wheat to any great extent. The wants of New York, and of the large number of populous cities and towns which have sprung up in that portion of the State, call for an immense quantity of agricultural productions, many of which cannot be transported to great distances, and must, there-

fore, be produced near at hand. The question of remuneration will enter largely into the solution of every problem of this sort. A farmer who can raise two hundred bushels of potatoes on an acre of land, with a ready market for them at a moderate price, will find it more profitable than to raise thirty bushels of wheat on the same acre, at the highest market rate in times even of scarcity. Milk, fresh butter, green vegetables of all kinds, and animals for the slaughter-house, are among the daily necessities of great towns, and most of them must be raised or prepared for the market in the immediate neighborhood. Their production will absorb most of the geographical area of Long Island and the river counties. But the western and central portions of New York are beyond the influence of these daily wants, and the only question as to the continued cultivation of wheat will be, whether with the advantage of a market near at hand, they can compete with the wheat districts of the West, and sell at remunerating prices. I had occasion, some five years ago, to settle an account on the basis of the price of wheat at Albany, in May, for the twenty preceding years, and it was adjusted at the average of \$1.32 per bushel. I doubt whether, in any twenty consecutive years

hereafter, it will average less. At this price, a crop of twenty bushels the acre will pay liberally. There is reason to believe that the soil of the wheat-growing district of this State is as well fitted for the permanent cultivation of wheat as that of the western prairies; for though the latter are so rich in humus, or the remains of organic life, they are less liberally supplied with the mineral substances which wheat requires, and which are, to some extent, furnished by the constant disintegration of the rocks, on which the soil of the former district rests. In other words, if this supposition is correct, the former will, with the same treatment, produce, in a long succession of years, equally remunerative crops; and if the cultivation of wheat shall decline in this district, it will probably be from the growth of large towns in the western part of the State, demanding, like the city of New York, a different class of agricultural products.

Though the other great districts of the State are less adapted to the growth of wheat, they have a peculiar fitness for other productions. The counties on the east of the Hudson, which were denominated in the final report of the geological survey of the State, the maize district, are, from the geological character of the underlying rocks,

admirally adapted to the cultivation of Indian corn. The district constituting the southern tier of counties, while it is productive in corn and coarse grains, is more particularly fitted for grazing. And the same remark is applicable to the counties which skirt the western bank of the Hudson. Our mountains, with the exception of a few granitic ridges and peaks, in the northern and southern highland districts, are susceptible of cultivation to their very summits. The eastern range, particularly, running as it does from north to south, is warmed on both sides either by the morning or the evening sun.

There are two great districts which have been considered nearly worthless, but which, I think, are destined to contribute largely to the agricultural production of the State. The first of these lies between the upper waters of the Hudson and Lake Ontario. It abounds in minerals and in timber; the vallies are filled with a rich vegetable mould, and the sides of the sharp peaks which rise to the maximum height of five thousand feet are capable of producing the most luxuriant grasses. It is a cold region, and on its greatest elevation the snow, in backward seasons, lies unmelted even into midsummer; but beneficent nature seems to have distributed throughout all

portions of her vast dominion, even the most inhospitable in their aspect, the substances which support vegetable life. The Swiss, leaving the valleys when the summer returns, ascend the Alps, almost to the elevation of perpetual snow, and building their *châlets* on the mountain-sides pasture their flocks and herds on narrow plateaus, which, from below, seem inaccessible. Here, indeed, as in our knowledge of the spiritual life, there is a limit to our progress upward. Man must not rise, even in the physical world, above his prescribed level. As we go up into the loftiest mountains on our globe above the clouds, which God sends down to veil their summits from our sight, nature locks up her treasures of organic life in chambers of frost, and warns us by signs as significant as that which scattered the presumptuous builders of Babel, that our mission here lies nearer the lower surface of the earth. But within our appointed limits everything is mercifully made to minister to our wants. Even the most refractory rocks are instinct with the principles of organic life, and are slowly but steadily yielding them up to the silent agencies of nature. The granite ridges of our highland districts, which seem so unchangeable, are undergoing perpetual alterations. Felspar and other

constituents of granitic rocks contain, in large proportions, the substances necessary for the nutrition of plants. Frost, and heat and rains, acting on their surfaces, are constantly breaking them up, and thus these huge masses are forever distilling like dew, into the valleys beneath, the elementary principles of vegetable life. The cattle, if left to themselves, would turn away from the rank vegetation of the meadows and plains, and gather around the bases of the mountains to feed upon the sweet grasses that spring up from the disintegration of their rocky breasts. It needs no prophet's vision to foresee that the valleys of this neglected district are to teem with waving grains, and that its mountains are to be covered, far up from their bases, with flocks and herds.

The other district, to which I refer, was called in the geological survey of the State the Atlantic district. It consists of Long Island, stretching out from New York Harbor 130 miles into the Atlantic ocean. A most extraordinary delusion has prevailed in regard to the productiveness of the central portion of this district—a delusion natural enough with those who only know it by description; for one of the historians of the Island pronounced it “a vast barren plain” with

a soil "so thin and gravelly that it cannot be cultivated by any known process." And yet the surface soil of this whole region, with some inconsiderable exceptions, consists of a rich loam, from twenty to thirty inches in depth, easily cultivated, and made highly productive without immoderate manuring. Some of the best farms in the southern part of the State have, during the last five years, been made in this condemned region; and it is shown by the agricultural survey of the State that the Island produces fourteen bushels of wheat to the acre, considerably beyond the average of the State, and very little less than that of the western district. In a few places the gravel, with which the surface soil is underlaid, crops out, but these localities are believed not to exceed two per cent of the whole Island. I have been in the habit of visiting it in summer for twenty-five years, and have had the best opportunity of noting its productiveness. There are farms which have been two centuries under cultivation, and which, by good management, continue to yield abundant crops. Fields of corn, and of the most luxuriant grasses, run down to the very sand hills which the ocean throws up, as it were, to bound its own encroachments. Here too, as on mountains of granitic rock, nature is busy with

her ceaseless transformations. The sand hills are no sooner thrown up by the sea than they begin to perform their office as a part of the solid earth by ministering to the sustenance of its inhabitants. Some weeks ago, while strolling over them, I was struck with the variety of the vegetation with which they were covered, and in a few minutes I gathered specimens of twenty-one plants, some of them in bloom, with colors as rich and delicate as any to be found in cultivated fields—and all within a stone's throw of the breakers.

“ From these bleak sands spontaneous shoot

“ Fresh forms of re-created life—

“ The spear-shaped grass, the clustering fruit,

“ Born of the elemental strife.”

The seeds, borne down by rivers, or carried on the wings of the winds to the ocean, lie for awhile buried in the depths of the ungenial waters; but when, in the progress of time, they are thrown out upon the sands into the warmth of the sunlight, and are fed by the liquid streams of ammonia, which are distilled from heaven in summer showers, they burst into life, and clothe the naked strand in verdure and beauty.

Of all the districts of the State, this has the finest summer climate, and the winters are mitigated and made temperate by the surrounding

waters. Closer observation and successful experiment have dissipated misapprehension in regard to its fertility: they have shown that its soil is warm, genial, and productive; and there is little hazard in predicting that it will, at no distant time, become the garden of the city of New York.

Whether the agriculture of this State shall become what the natural capacities of the soil fit it to be, or whether the fertility of our lands shall be worn out by overtaking them, and we become the dependants of other communities for our daily bread, depends on ourselves. I believe our whole duty may be comprehended in a single precept. Let us give back to the earth in manures and fertilizing substances as much as the earth gives to us in food. Nothing less will fulfil the universal law. Nature, which has decreed that no atom of matter shall be destroyed, has decreed also that nothing can be taken with impunity from any one of her great kingdoms without making compensation for it. The elements, of which the earth, the air, the sea, their inhabitants, and the vegetable world are composed, disappear and appear again under new forms: the substances which enter into the organization of plants, are consumed, and are converted into the flesh of animals, and when these decay, are given

back to the earth to begin anew the same process of transformation; but not the minutest particle shall perish until the end of all created things shall come. To preserve the productiveness of the earth, nature only prescribes to us a conformity to her own law. Nothing is to be wasted or thrown away. The remains of all we consume, and of the food of our cattle, the portions of vegetable or animal matter which we reject as unfit for our use, are to be restored to the fields from which we have drawn our sustenance. The distinguishing characteristic of our husbandry is wastefulness. Every great town draws largely on the fertility of the country for its subsistence, and gives back little in return. The offal and the remains of all the animal and farinaceous substances, which are consumed by the city of New York, given back to the soil from which they are derived, would be worth millions of dollars a year in the productive power they would create. The time will come when a thorough reform will be made in this respect—when our great cities, instead of draining into the ocean and into rivers the remains of what they consume, will gather them up and restore them to the earth, the fertility of which they are gradually wasting.

In the meantime, let those whose high vocation it is to cultivate the soil, to preside over the sources of production, from which all classes of men derive their sustenance, bear in mind a few great truths. The farmer who stints his fields, is as unwise and improvident as he who starves his working cattle ; in both cases he is diminishing the ability of a faithful servant to be useful to him. The man who obtains from a field not properly fertilized, ten bushels of wheat, when by manuring he might have obtained twenty, is selling his labor at half its value. He who does not give back to his fields as much as he takes from them, sells their fertility in his crops ; and the fertility of the soil is the farmer's capital. He who permits the remains of animal or vegetable substances to decay around him, instead of incorporating them with the soil, impairs the comfort and healthfulness of his home, and by a slow but unfailing process prepares the destruction of his farm, and the impoverishment of his posterity. The farmer who will keep these truths in view, and act in accordance with the rules they suggest, will find his compensation in the increasing products of his farm, in the augmentation of his wealth, and in the promotion of the general prosperity.

An admirable work, by Baron Liebig, entitled "Letters on Modern Agriculture," has just been published by Wiley, in New York, and it would be well if it were in the hands of every agriculturist in the State. It enters largely into the subjects on which I have briefly touched; and it shows that practical agriculture and scientific chemistry, instead of being in conflict, as some matter of fact men suppose, are, in truth, mutually dependant on each other in the great work of reforming prevailing errors. It is the province of science to seek out and disclose principles and causes, and it is the business of practice to use the knowledge thus acquired to the greatest advantage for the common purposes of life.

Agricultural chemistry has rendered no greater service to the public than in showing the necessity of scientific training for the cultivation of the earth. It was a common opinion a few years ago, that any man who could hold a plough, or use a hay-fork with dexterity, was fit to be a farmer. And yet his vocation is one of the most difficult, when considered in its numerous relations to the chemical properties of his fields, the influences of wind, moisture, and temperature varying in different localities, and the numberless causes which promote or obstruct the growth of

plants. If there is any pursuit, which more than all others requires training, with some knowledge of the great principles which concern the fruitfulness of soils and the support of vegetable life, it is this. And yet, while we have for years had training-schools for medicine, and law, and theology, we have, until recently, had none for agriculture, the basis of all human industry. This is a great social wrong, which we have only just begun to reform by the institution of a school in the western district.

But, gentlemen, I have already outrun the time which I had allotted to the performance of the duty with which you have honored me, and will hasten to a conclusion. I cannot do so without bearing testimony to the great service which this Society has rendered to the cause of American agriculture by its steady and its disinterested labors. The valuable information it has circulated through its annual publications for nearly twenty years, on all the great subjects of practical husbandry, has given them new interest and importance, and the noble display of the last four days, in the products of the earth, in animals, and in agricultural machinery, attests its eminent success, and the strong hold it has gained on the confidence of the community.

In conclusion, gentlemen, let me repeat my conviction that no State in the Union possesses in a higher degree than ours the elements of a varied and abundant production. On such an occasion as this I could do no more than glance hastily at the leading characteristics of some of the larger divisions of our territory, in their relations to certain classes of agricultural products. Half a century more will, I do not doubt, develop the peculiar fitness of each for the productions for which they are respectively best adapted by climate and physical constitution. Those who are to come after us, if we do our duty as faithful custodians of the productive powers of that portion of the earth which has been confided to us, will see the western district yielding, in undiminished abundance, its annual contributions of wheat, the eastern equally bountiful in corn and the coarser grains, the valleys everywhere teeming with varied productions, the elevated portions of the southern tier of counties, and the mountain slopes of the northern and southern highlands covered with flocks and herds, and the Atlantic district pouring its daily supplies into the vegetable and fruit markets of the great city. Before the nineteenth century shall have ended, the island of New York will be covered with ware-

houses, and workshops, and dwellings, with a population so full as to be incapable of further condensation. He who shall live to that day, and shall stand on the heights of Fort Washington—an elevation worthy of the immortal name it bears—the future central point of the wealth and taste of the great commercial capital,—will look down on a fairer scene than that which bursts on the sight from the plain of Sorrento, or the classical crest of Pausilippo. For he will look out—not over the sites of buried cities, or living cities abaséd by inaction and sloth, and on waters scarcely stirred by the keels of commerce,—but on rivers bearing on their bosom the mighty traffic of continents, and on cities and shores instinct with life, and liberty, and industry, and intellectual power.

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