The Nation's Future

ADDRESS

DELIVERED BY

MR. JAMES J. HILL

AT THE

MINNESOTA STATE FAIR

ST. PAUL, MINNESOTA

SEPTEMBER 3, 1906

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The highest conception of a nation is that of a trustee for posterity. The savage is content with wresting from nature the simple necessaries of life. .But the modern idea of duty is conservation of the old and modeling of the new in order that posterity may have a fairer dwelling place and thus transmit the onward impulse. 'The ideal of the prudent, loving", careful head of every family is the true ideal for a nation of rational men. The people of the United States, as far as any perhaps, have meant to follow this pattern. It is worth while to consider how far they have been successful and where they have failed. For not for eight centuries has any people found itself dowered with such embarrassment of riches.

The average man is often more interested in speculative theories than in his plain duty toward himself and his neighbor. The average state is filled with visions of its place in the procession of the years, while it overlooks the running account of daily expenses. Problems we have found and trilled with', in confusing number and variety; but the problem of the future material condition of our country, of an inventory of its assets and liabilities, of the inevitable demands upon its resources and the careful adjustments by which alone they may be preserved, has thus far been a subject for little more than a passing thought. National security calls for a just accounting of the business affairs of this great nation.

Let us try to cast our minds twenty or twenty-five years ahead and see what will then be our condition. The main elements of this problem, which above all others is crowding upon our attention, arc three: Possibilities of population, actual and possible natural resources, and possibilities of productive application of one to the other. As the prudent man, about settling himself in life, sums up his possessions, his opportunities for earning income and the demands upon him of a family to be fairly cared for and left in a position to begin the world at least as advantageously as he himself, so the people of the United States should know with reasonable exactness just where we shall stand half a century from now.

The population index has the simplicity of ascertained vital statistics. Subtracting from the total population of the country as returned by each census since iS8o the immigration for the decennial period, the ratio of increase for the first decade is slightly over, and for the second decade slightly under fifteen per cent. So careful an observer as Leroy Beaulieu gives the natural increase of our population as fifteen and two-tenths per thousand per year. It is fair, therefore, to reckon the increase by the excess of births over deaths at fifteen per cent, on the average, for each decade. The additions by immigration are more variable. It is highly probable, however, that the oncom-ing tide will increase. Only in periods of severe depression has immigration fallen much below the half million mark for the last twenty-five years. In good or fairly grind times it has gone greatly above. In the two years before 1905 it exceeded 800,000 annually, while for each of the last two years it has exceeded I,000,000 It is a conservative estimate, therefore, to add 750,000 a year for increase of population from this source, or 7,500,000 fur each decade. Computed on this basis, the population of the United States in the near future will show these totals:

Population in	1910.	95,248,895
Population in	1920.	117,030,229
Population in	**1930.. . . . . .**	**142,091,663**
Population in	**1940.. . . . . .**	170,905,412
Population in	**1950.. . . . . .**	**204,041,223**

The startling quality of these figures is the magnitude of our problem. It is not even a problem of to-morrow, but of to-day. Within forty-four years we shall have to meet the wants of more than two hundred million people. In less than twenty years from this moment the United States will have 130,000,000 people. Where are these people, nut of some dim, distant age, hut of this very generation now growing to manhood, to he employed and how supported? When the searchlight is thus suddenly turned on, we recognize not a mere speculation, but the grim face of that specter which confronts the unemployed, tramping hateful streets in hope of food and shelter.

We cannot adapt conditions to the future by restricting the growth of population. The natural increase by birth will continue. We may not, did we wish it, interfere with the immigration movement, except perhaps to enforce a more careful scrutiny of the moral and industrial fitness of these newcomers. Notwithstanding the addition of more than a million people a year from abroad, nearly all of them men and women who must work for a living, labor outside of the cities was never as scarce or wages as high as at the present time. Immigration lingers in the great centers and adds to the difficulties attending employment.

The farms, stretch out their hands in vain. Railroads in making extensions have to get help at the highest market price, and find a large percentage of those whom they employ mere hoboes who desert as soon as they have succeeded in gutting transportation from one part of the country to another, farmers besiege the employment agencies in vain, and offer (be lazy tramp a sum for a day's work in the Acid unheard of in any other country in the world. The situation grows more embarrassing yearly. Hours of labor are being reduced in some of the states for farm as well as shop hands. Men are scarcer as the movement of population to the cities grows more pronounced. A considerable portion of this year's magnificent crop will be cither reduced in quality or altogether lost by reason of the impossibility of getting labor to handle it properly. Discouraged small farmers are now selling their land to larger proprietors who can profitably substitute machinery for men.

The country needs more workers on the soil. Not to turn the stranger away, but to direct him to the farm instead of the city; not to watch with fear a possible increase of the birth rate, but to use every means to keep the boys on the farm and to send youth from the city to swell the depleted ranks of agricultural industry is the necessary task of a well-advised political economy and an intelligent patriotism.

The United States has been able easily to take care of the great increase of population in the past because it had a vast area of unoccupied land. This was the main asset in its natural inheritance. Within practically the last half of the last century the whole country from the Mississippi River to the Rocky Mountains was occupied. No pressure of population could make itself severely felt when it might be turned loose in such an empire. In those fifty years there were added 547,640,932 acres to the agricultural area, an increase of nearly two hundred per cent., and the increase in the actually improved acreage was nearly three hundred per cent. This is cut off from the list of our resources. Within the last six years there have been transferred from public to private ownership more than [00,000,000 acres of government land, an area twice the size of the State of Minnesota. The entire area of surveyed and unappropriated land within the United States is only two and a half times that amount.

At the present rate, therefore, every acre of public land would disappear within the next fifteen years. But as a large percentage of the lands included in this estimate are wholly or partially unfit for tillage, it is literally true to say that our arable public lands have almost disappeared. And where are our children to find standing room and the tens of millions of the future a place for wholesome industry ? This is an intensely practical question. It is immediate. For within twenty years we must house and employ in some fashion fifty millions of additional population; and by the middle of this century, at a time when the child now born will be in the prime of life, there will be approximately two and a half times as many people in the United States as there are to-day.

No nation in history was ever so confronted with a sterner question than this certain prospect sets before us. What are we

to do with our brother, **whose** keeper we are? How are we **to** provide our own children with shelter and their daily bread?

AMERICAN WASTE

Rational consideration of our potential resources and of available future employment for this great multitude must, of course, proceed together. Labor must have material to work upon; and labor and material must also be so conjoined that the sum total shall be an increase of product equal to the advancing demands upon it, while at the same time our natural resources shall not be exhausted. Only thus can the future be made safe. Only thus can the people of the years to come be saved from retrogression. We come back to the big;, fundamental things; to raw materials, and supply and demand, and the severe utilities without which no nation, great or small, can long keep poverty and distress or even death at bay.

"Of all the sinful wasters of man's inheritance in the earth—and all arc in this regard sinners the very worst are the people of America." These are the words of a great scientific authority, the late 1'rof. Shaler, of Harvard University. This whole nation of presumably busy and serious men has originated many wasteful and extravagant policies; nay, worse, it prides itself upon some of those very records of consumption which establish the astonishing fact of national destruction and waste that cannot be repaired. The mighty wealth of this continent was adequate, with ordinarily provident handling, for an indefinite increase of (he demands upon it. The inheritors of this wealth have already so far dissipated it that some prudent care of the residue cannot be postponed without certain disaster,

FOUR SOURCES of WEALTH.

The summation of actual resources of national wealth is a comparatively short and simple process. Passing over the atmospheric elements that, minister indirectly to the national economy, there are just four sources from which mankind must-draw all natural wealth. Of these the sea does not supply more than two or three per cent, of man's food. It may therefore be dropped from the calculation, as it cannot be made much more largely contributory to human support. The forest, once a rich

heritage, is rapidly disappearing[1]. Its product is valuable not for food, but for shelter and as an accessory in the production of wealth. Its fate is interesting' here rather in the role of an example. For we have done with our forests already what we are doing just as successfully with the remainder of our natural capital. Except for the areas on the Pacific Coast, the forest as a source of wealth is rapidly disappearing. Within twenty years, perhaps, we shall have nowhere east of the Rocky Mountains a timber product worth recording; and shall then be compelled to begin in earnest the slow process of reforesting.

What is less clearly perceived is that we are wasting in the same fashion other resources which no repentance and no ingenuity can restore or replenish. The exhaustion of the greatest of these, the land, will be spoken of later. Our mineral wealth, however, stands on another plane. What is taken from the mine can never be replaced. Through all eternity, as far as we can see, the consumption of mineral wealth stored in I lie ground must be a finality. The possible gross product is mathematically limited. The adaptation of this to future uses should be a matter of infinitely greater anxiety than the present balance sheet of a business concern. Yet the singular fact is that, among a people convinced that they are grounded in the rudiments of political economy, the progressive exhaustion of this precious resource is everywhere heralded as a triumph of enterprise and a gauge of national prosperity. The nation publishes periodically the record of a scattering of assets never to be regained, and waits, with a smile of complacence, for general congratulation.

COAL AND IRON.

The two great resources of the under earth, economically speaking, that are indispensable to human comfort and growth, are coal and iron. Our inheritance of these was princely. The most wonderful achievement of this age is the incredible activity with which we are exhausting them. The coal areas and measures of the United States are describable only in somewhat general terms. But the fact of the future is not doubtful. No dependable authority gives more than a century of life to our main available coal supply, it will not be all gone by that time, but the remainder will have to be obtained from deposits of low grade or at great depths, or from points remote from where it

is most needed It. will be poor in quality, or high in price, or both, so that its economic employment on existing terms will be very difficult. A generous estimate of competent geologists fur the life of the better coal measures of En rope as a whole is less than one hundred years. The output of the United States is now more than 350,000,000 tons annually. It doubled within the decade from 1895. It now amounts to between forty and fifty per cent, of the world's entire supply. The estimated life of the Pennsylvania, anthracite fields, whose narrow area has permitted closer approximation, is put at little more than fifty years. The larger supply of soft coal has to answer a demand many times as great.

It is certainly a moderate statement to say that, by the middle of the present century, when our population shall have reached the two hundred million mark, our best and most convenient coal will have been so far consumed that the remainder can only be applied to present uses at an enhanced cost which would probably compel the entire rearrangement of industries and revolutionize the common lot and common life. This is not n mere possibility but a probability which our country must face.

IRON GOING FAST.

The prospect of the mighty iron interest is even more threatening and more sure. Our available iron deposits have been carefully catalogued. All the Acids of national importance have been known for at least twenty years. Within that time their boundaries and probable capacity have been estimated, and the whole country has been prospected for this king of minerals. The most reasonable computation of scientific authority affirms that existing production cannot be maintained for fifty years, assuming that all the available iron ore known to us is mined. In fact, the limitation is likely to be less than that period.

In 1870 the United States produced a little more than 3,000,-000 tons of iron ore. It increased by about one hundred and fifty per cent, for each decade to 1890. As late as 1895 it was a trifle short of 16,000,000 tons. In 1903 and 1903 it was, in round numbers, 35,000,000 tons, and, last year it rose to about 42,000,000 tons. At this rate, as all the trade statistics indicate, and as our present policy and growth in population require, it will reach 50,000,000 tons almost immediately. By every possi-

ble means we are stimulating consumption; especially by a tariff that places a bounty on the exhaustion of the home supply of both coal and iron, thus prohibiting recourse to outside supplies and compelling the exhaustion of our own reserve.

Now, the main iron deposits in this country arc those in the Lake Superior region. These furnish nearly or quite three-quarters of the entire product of the United States. Deprived of these, our output would shrink to a beggarly ten million tons or so a year. And these deposits are not veins of unknown depth and richness, but moles or pockets of ascertainable volume. There is within reach possibly 1,500,000,000 tons of merchantable iron ore in the deposits of Minnesota, Wisconsin and Michigan. This will keep our industry going, supposing consumption to remain stationary, for thirty or forty years. In the year 1950, as far as our own resources are concerned, will approach an ironless age. For a population of 200,000,000 people, our home supply of iron will have retreated almost to the company of the precious metals.

There is no substitute whose production and preparation for practical use is not far more expensive. Not merely our manufacturing industries, but. our whole complex industrial life, so intimately built upon cheap iron and coal, will feel the strain and must suffer realignment. The peril is not one of remote geologic time, but of this generation. And where is there a sign of preparation for it? Where, amidst, our statistical arrays and the flourish of trumpets with which the rise of our manufactured product is always announced, do we hear so much as a whisper of care about the needs of the time marching so swiftly upon us? Instead of apprehension and diligent forethought for the future, the nation is engaged in policies of detail and opportunism,

ENGLAND AN EXAMPLE.

If any man think this prophecy of danger fantastic, let him glance at Great Britain. That nation was not so extravagant as we, because it did not compel the instant exhaustion of its resources by a tariff prohibiting such imports, and because its surplus population could and did scatter over the globe. "But. it has concentrated effort upon the secondary form of industry— manufacturing—at the sacrifice of the primary—the tillage of the soil. Its iron supply is now nearly exhausted. It must

import much of the crude material or close its furnaces and mills, its coal is being drawn from the deeper levels. The added cost pinches the market and makes trade smaller both in volume and in profits.

The process of constriction has only begun. None are advertising it, only few understand it. Rut already there is the cry of want and suffering from every street in England. From a million to a million and a half of men are huddling together in her cities, uttering that must pathetic and most awful ultimatum, "Damn your charity, gives us work/' And this is only the beginning of that industrial readjustment which the unwise application of industry and the destruction of natural resources must force everywhere. He who doubts may easily convince himself by an honest investigation of the facts, that this is no sensational prediction, but something as established and inevitable as an eclipse or the return of the seasons. The most amaz-ing feature of our situation, indeed, is its vast and compelling simplicity.

Every people is thus reduced, in the final appraisal of its estate, to reliance upon the soil. This is the sole asset that does not perish, because it contains within itself, if not abused, the possibility of infinite renewal. AM the life that exists upon this planet, all the development of man from his lowest to his highest qualities, rest as firmly and as unreservedly upon the capacities of the soil as do his feet upon the ground beneath him. The soil alone is capable of self-renewal, through the wasting of the rocks, through the agency of plant life, through its chemical reactions with the liquids and gases within and about it. A self-perpetuating race must rely upon some self-perpetuating means of support. Our one resource, therefore, looking at humanity as something more than the creature of a day, is the productivity of the soil. And since that, too, may be raised to a high power or lowered to the point of disappearing value, it is of the first consequence to consider how the people of the United States have dealt with this, their greatest safeguard and their choicest dower.

This is pre-eminently and primarily an agricultural country. Its soil has been treated largely as have been the forest and mineral resources of the nation. Only because the earth is

more long-suffering, only because the process of exhaustion is more difficult and occupies a longer period, have we escaped **the** peril that looms so large in other quarters. The reckless distribution of the land; its division among all the greedy who chose to ask for it: the appropriation of large areas for grazing purposes, have absorbed much of the national heritage. Only one-half of the land in private ownership is now tilled. That tillage does not produce one-half of what the land might he made to yield, without losing an atom of its fertility. Yet the waste of our treasure has proceeded so far that the actual value of the soil for productive purposes has already deteriorated more than it should have done in five centuries of use. There is, except in isolated and individual cases, little approaching intensive agriculture in the United States. There is only the annual skimming of the rich cream; the exhaustion of virgin fertility; the extraction from the earth by the most rapid process of its productive powers; the deterioration of life's sole maintenance. And all this with that army of another hundred million people marching in plain sight toward us, and expecting and demanding that they shall be fed.

LAND VALUES SHRINK

From 1860 to 1900 is a far cry. In that-time our population leaped from 31,000,000 to 76,000,000. In that time a vast area of wildness was put beneath the plow. Yet in those same years the area of improved land in the North Atlantic States remained stationary. It is now steadily on the decrease. In the South Atlantic States, while the inclosed area is larger, the farming area has decreased by more than 2,000,000 acres.

The test of values is still more indicative. Every farm properly cared for should be worth more money for each year of its life. The increase of population and demand, the growth of cities and markets, and the development of diversified farming with density of settlement should assure a large increment. Even where large quantities of new and fertile land are opened, these influences, together with the lowest cost of transportation in the world, should make the growth of values steady. Within the twenty years between 1880 and 1900 the aggregate value of farm lands and improvements, including buildings, declined in every one of the New England and Middle States except Massa-

chusctts alone. The total decrease in values, for these ten States, of the first asset of a civilized people is more than $300,000,000. Nor is the attempted explanation by the census bureau of this shrinkage either adequate or convincing. Even the great and fertile State of Ohio, in the Middle West, showed a decline of more than $60,000,000. This change in the section of oldest cultivation under modern conditions is significant, It is not singular. The soil of the South is moving on the same decline, though the fact is less obvious in the total change of agricultural conditions since the Civil War. On the new lands of the West, where once the wheat yield was from twenty to thirty bushels per acre, it is now from twelve to eighteen. Frankly, and without shame, this is attributed to "the wearing out" of the soil, as if the earth were a garment that must be destroyed by the wearing.

If the earth, (lie mother of humanity, is to "wear out," what is to become of the race? The fact is that soils, properly treated, maintain their productiveness indefinitely under cultivation. The further fact is that, with the disappearance of pestilence and the discontinuance of war that belong to the future, all contributing to the growth of population, the productive capacity of the soil must be sustained at its highest point or the world suffer want.

The life-sustaining power of the soil is lowered in two ways: First, by physical destruction, through the carrying away of the earth to the sea; and, second, chemically, by the withdrawal of the elements required for plant life. The waste from the former cause is very great. It accounts for sterility in the older, which are also the more hilly, portions of the cultivated country. It may easily be checked or prevented. The agriculture of Japan, which is of the highest type, preserves a mountain farm intact by terracing and careful modulation of its level. Prof. Shaler says that a field lying at an angle of twenty degrees can be totally destroyed in a hundred plowings. Throughout the South this process of denudation has proceeded far and is going forward rapidly. lie estimates from personal observation that in the State of Kentucky, which has not been largely cultivated for more than a century, one-tenth of the arable soil has been

destroyed, and that a considerable portion of this cannot be restored by any application of industry and care.

More serious and even more universal and speedy is the process of deliberate soil exhaustion. New England once supported a population of farmers whose shot was heard around the world. Prof. Carver, of Harvard, after a tour of rive hundred and fifty miles on horseback last year, records his conclusion that "agriculture as an independent industry, able in itself to maintain a community, does not exist in the hilly parts of New England." It is not many years since the favored wheat-producing areas of the American Northwest gave a yield of from twenty-five bushels per acre upwards. Now an average of twelve to fifteen is accepted as satisfactory. Under the stress of need, by intelligent cultivation, many of the lauds of Great Britain, cropped for a thousand years, are made to bear thirty bushels to the acre. The rich, deep soil of our own country, drawn upon for a few decades, produces about twelve. The same ratio holds good of other cereals and of every product of the field. The sea. islands that once grew the most famous cotton staple in the world are virtually abandoned.

The people have neglected the preservation of the soil. They take away all and give nothing back. Thorough fertilization of the land has no place in the general work on the American farm. Average American agriculture means the extraction from nature of the greatest immediate return at the lowest possible outlay of labor or money, with sublime disregard of consequences. **Except** at scattered experiment stations and in isolated instances there is little done in the United States towards farm economies. Scientific adaptation of soil to product, intelligent rotation of crops, diversification of industry, intensive farming— constitute the rare exception and not the rule.

Only two states in the Union show an average total value of farm products in excess of $30 per acre of improved land. The figure for Illinois in 1900 was $12.48; for North Carolina, $10.72; for Minnesota, $8.74. By proper cultivation these returns could easily be doubled and still leave the soil's resources unimpaired. The doubling of all products of the farm would add to the wealth of this country from $5,000,000,000 to $6,000,-000,000 every year, according to the crop yield of the season and the range of market prices.

Therefore, and this is the focal point of the whole matter, the country is approaching' the inevitable advent of a population of 150,000,000 or 200,000,000, within the lifetime of those now **grown** to man's estate, with a potential food supply that falls as the draft upon it advances. How are these people to be fed?

The foreign trade of the United States has been made an object of more or less solicitude and self-gratulation. What we do is lo export in immense volumes two great schedules of commodities. One contains raw materials, the products of the upper and the under earth. It includes, adding- articles like flour, provisions and refined oil, which are but one decree removed from the raw state, changed in form for economy of transportation, three-fourths of our entire exports of domestic commodities. The treasury of our future is being- despoiled to swell the rapidly growing[1] riches of the day. The remaining thirty per cent, or less, which is all that can properly be classed as products of manufacture, is this stored treasure in another form. Exports of domestic maim failures, construing the term with proper strictness, constitute a trifle more than twenty per cent, of the total.

This pitiful showing in the markets of the world where our people might find occupation, where a larger proportion of them must find it in the future if all are to survive or remain, a showing that not even the endeavors of boasters can improve, is the inevitable consequence of a policy more destructive than that, of the spendthrift. Lest the conditions of life should be made too favorable for this people, its home markets are surrendered, bound rigidly by law, to the comparatively small number who control domestic supplies of raw material for manufacture. At the same time the cost of production effectually prevents the securing of any considerable or permanent control in the markets of the outer world, where alone our millions of to-morrow could find outlet for this form of their activity.

The single intelligent advance on practical Hues made by public authority within the last quarter of a century is the

reclamation law. Initiated and paid for *by* a few western railway companies, it provides for a real addition to the sources of food supply and the opportunity for employment. But it is only a light breeze blowing[1] in the face of a cyclone. If every project contemplated as feasible were executed, and if all were completed instantly by the rub of a magic lamp, some 60,000,000 acres would be added to the arable national domain. And if only forty acres of this were assigned to each family, it would supply the needs of the actual addition to population, by natural increase and by immigration, for less than three years.

Prof. Shaler, in a survey of world conditions from the broadest scientific point of view, looking at man and his storehouse in the large, at supply and exhaustion, says, in "Man and the Earth:" "This attitude of men as regards the future of the material value of the earth notably contrasts with what they hold to the moral and political future of their kind. A large part of their thought and endeavor goes to that group of problems, but practically none at all to the immediate questions that relate to the material foundations on which all the higher development of (be life of their kind has to rest." Man may win, beyond peradventure man will win, from the silent willingness of nature, from her sternness and her clemency, from her outpouring and her withholding, the utmost of his aspiration. But the highway to the perfect condition must be fashioned from the common clod under his feet. And for every error and omission he must pay the uttermost farthing. It is not so much, at this point, a question whether it is to be our people or another who win to higher ideals of life, of government and of conduct, as it is whether they are to escape the shock of an awakening that must leave them face to face with the old struggle for existence, with weakened moral fiber and profound discouragement. Certain it is that the time has come for setting our household in order, and creating a serious study of national activity and economy according to a truer insight and a more rational mood.

FARM PROGRESS **NEGLECTED.**

The first step is to realize our dependence upon the cultivation of the soil. To this end all that has been said thus far is

contributory. The next, will be to concentrate popular interest and invention and hope upon that neglected occupation. We are still clinging to the skirts of a civilization born of great cities. We at this very moment: use a slang which calls the stupid man "a farmer." Genius has shunned the farm and expended itself upon mechanical appliances and commerce and the manifold activities whose favorable reactions filter back but slowly to the plot of ground on which stands solidly the real master of himself and of his destiny. If we comprehend our problem aright, all this will change; and a larger comprehension of agriculture as our main resource and our most dignified and independent occupation, will for the future direct to their just aim, in the improvement of methods and the increase of yield, the wisdom and the science and the willing labor of the millions who thus may transmit to posterity an unimpaired inheritance.

Agriculture, in (he most intelligent meaning of the term, is something almost unknown in the United States. We have a light scratching < > f the soil and a gathering of all that it can be made to yield by the must, rapidly exhaustive methods. Except in isolated instances, on small tracts here and there, farmed by people sometimes regarded as cranks, and at some experiment station?, there is no attempt to deal with the soil scientifically, generously or even fairly. In manufacture we have come to consider small economies so carefully that the difference of a fraction of a cent, the utilization in a by-product of something formerly consigned to the scrap heap, makes the difference between n profit and bankruptcy. In farming we are satisfied with a small yield at the expense of the most rapid soil deterioration. We are satisfied with a national average annual product of $11.38 per acre at the cost of a diminishing annual return from the same fields, when we might just as well secure from two to three times that sum. Here is a draft which we may draw upon the future and know that it will not be dishonored. Here is the occupation in which the millions of the future may And a happy and contented lot.

When we have added to the national export trade half a billion dollars per annum, the country rings with self congratu-

lation and we demand the plaudits of the world. If a process for extracting metallic wealth from rocks were to he discovered to-morrow, such as to assure the country an added volume of a billion dollars in wealth every year, the nation would talk of nothing; else. Yet these things would be hut a trifle when compared with the possibilities of agricultural development in the United States. The official estimated value of all farm products of the country last year was $6,415,000,000. Discount this for high prices and generally favorable conditions by twenty per cent, and over $5,ooo,ooo,<x.)o remains. It is also officially recorded that of the appropriated farm area of the United States, a little less than one-half is under cultivation. Utilize the other half and, without any change whatever in methods, the output would be practically doubled. Change methods only a little, not to high class intensive farming, but to an agriculture as far advanced as that of those other countries which have made the most progress, and without any addition whatever to the existing cultivated farm area, the product per acre would be doubled. We should be able, by directing surplus population to the land, and by the adoption of a system of culture in full operation elsewhere, greatly lo increase this minimum present yield of $5,000,000,000 per annum of farm products. That is, we may add $10,000,000,000 or $[5,000,000,000 every year to the national wealth if we so choose. And (his is but a beginning.

(t will be well, in defense of a prospect so promising[1], to glance at the achievements of other peoples upon whom necessity has already imposed wisdom. It is, perhaps, not as generally known as it should be that Great Britain, with a soil and climate far inferior to our own for wheat growing, produces more than double the quantity that we do per acre, The average for the United States in 1899 was twelve and three-tenths bushels per acre. In 1904 it was twelve and live-tenths. That is about the figure for a long series of years. More than half a century ago the average yield in England had risen above twenty-six bushels to the acre. In the latter part of the eighteenth century agriculture had reached almost its lowest estate in the United Kingdom. Men who saw then as we should see now the paramount importance of its restoration devoted them-

selves to its advancement. Arthur Young made the most complete study of local conditions ever attempted. Statesmen were interested and men of science enlisted. A hoard of agriculture was created in 1793. Sir Humphry Davy delivered before it in 1812 a series of remarkable lectures on scientific agriculture. Landed proprietors look up the cry, interest was evoked everywhere, new theories were put into practice almost as rapidly as the commons were inclosed, and between 1770 and 1850 there was an immense rise in production, in laborers' wages and in rents. Although agriculture in England has suffered in the last twenty-five years, by the opening of new land in America and the cheapening of the world's transportation, it has profited by further advances in knowledge. To-day a yield of thirty bushels of wheat per acre is about the average for the country. In Minnesota, with her fresh soil and unrivalled product, an average of fourteen bushels is looked upon with complacency. The average of Great Britain, applied to the acreage in this country, that now gives us something over 600,000,000 bushels of wheat in a fair year, would increase our product to over 1,500,000,000 bushels.

There are more instructive studies in national efficiency than this. The German Empire has nearly 60,000,000 people compressed within a little more than 200,000 square miles of territory. She has not tied her fortunes to a single interest. Her manufacturing industries are thrusting themselves into the markets of every country. I Tow to meet German competition is to-day the study of every intelligent leader of industry and every cabinet on the Continent of Europe, It will be found that a large share of her world-wide success is due to symmetrical national development. Agricultural industry has not been slighted, Behold a contrast that throws light upon the idle hosts of England's unemployed, inarching despondently through streets whose shop windows are crowded with wares of German make. .Between 1875 and 1900 in Great Britain 2,691,428 acres which were under cereals, and 755,255 acres which were under green crops, went out of cultivation. In Germany during the same period the cultivated area grew from 22,840,950 to 23,971,573 hectares, an increase of five per cent; and the area given over to grass shrank one-third. While her foreign trade

was making the great leap from $1,800,000,000 to $2,650,000,000, the yield of her cultivated fields per hectare made the following advances, measured in kilogrammes: Wheat, from 1,670 to 1,970; rye, from 1,490 to 1,650; barley, from 1,480 to 1,950; oats, from 1,070 to 1,840; and hay, from 2,230 to 4450, The wages of agricultural laborers rose about twenty-five per cent, between 1873 and 1892, and have advanced another twenty-five per cent, since then. This is the work of intelligence, of a complete appreciation of the national problem as a whole, of universally practical and technical education and of infinite patience. To agriculture as well as to other occupations will apply the conclusion reached by Prof. Dewar after a study of German industry and progress as a whole : "The really appalling thing is not that the Germans have seized upon a dozen industries, but that the German population has reached a point of general training and specialized equipment and possesses a weapon of precision which gives her an enormous initial advantage."

PROGRESS IN JAPAN.

For half a century Japan has been studying and assimilating the best to be found in the world. Japan is a world's university for instruction in the art of agriculture. Her national greatness is not merely built upon that, it grows out of that as the grain itself springs from the soil. Of her 45,000,000 people, 30,000,-000 are farmers. The whole body is supported by a cultivated area of but 19,000 square miles. Every foot of soil is utilized; the farmer is a specialist. For twenty-five centuries this people has turned to tillage as the basic industry of life. Her progress is in the right direction; growth, like that of the tree, from the ground up. The message of the victorious guns of Japan is a reminder of the fixed order and proportion in a healthy national development of industry. No nation that does not throw its intensest interest and expend the bulk of its force upon the cultivation of the soil can become or remain permanently great.

THE RICHES OF FRANCE.

In France a careful system of agriculture took root earlier than in Great Britain, and from it has been wrought a far stronger fabric of national prosperity. France is to-day the

banker nation of Europe. Any sound loan can be placed in Paris on short notice. In 1871 impoverished France was compelled to pay $1,000,000,000 to the conquering Germans. Thirty years afterward France had $500,003,000 seeking for investment. To-day her national debt of $6,000,000,000 is practically all held at home, and her holdings of foreign securities are not far from $15,000,000,000. She controls the purse strings of Europe; and Russia and Germany are guided in their foreign policies, are urged into or restrained from war, not so much by the pleasure of emperor, king or kaiser as by the decision of the world-financiers of France. The funds for this international financing are obtained largely from the savings of the industrious and frugal small farmers of France. Within the first fifty years of the nineteenth century agricultural improvement alone doubled the wealth of the country. Landed estates sell to-day for from three to four times as much as they brought at the time of the revolution. The valley of the Loire is one great garden. Every foot of soil has been studied and devoted to the growing of what will produce the largest, return. Although one-third of the area of the country is classified as uncultivable, the tilled portion yields food enough for one hundred and seventy inhabitants per square mile. Kropotkin says, in his remarkable study of agricultural methods: "Some thirty years ago the French considered a crop quite good when it yielded twenty-two bushels to the acre; but with the same soil the present requirement is at least thirty-three bushels; while in the best soils the crop is good only when it yields from forty-three to forty-eight bushels, and occasionally the product is as much as fifty-five bushels to the acre." From limited areas on experimental farms under special care as high as eighty bushels per acre has been obtained. But, taking cultivation as we find it for the country as a whole, the French now draw from the soil more than five times as much wealth as they did a century and a half ago.

This is the result merely of the common agricultural industry of France. The strength of the nation, its endurance of political changes, its economic place and its persistence as a wealth creator are due primarily to the fact that it is a nation of small farmers, pursuing what in this country would be called intensive, but what is really diversified farming.

BELGIUM AND JERSEY.

It is to Belgium and the island of Jersey that we must look if we would see the supreme achievement of careful farm industry exercised under conditions not specially favorable. The agriculture of these countries represents a fair average of what the people of any other might do, with equal patience, intelligence and industry. Originally the soil of "Belgium as a whole was not highly favorable to cultivation. Yet Belgium produces now, after allowing for all imports of food products, and exclusive of exports of the same, enough home-grown food to supply the wants of four hundred and ninety inhabitants to the square mile. This is in addition to the large manufacturing industries of the country, and offers a, fair model and measure of what might be done under ordinary conditions with the earth by man in any part of the world not cursed by sterility.

These figures, which in reality supply the answer to our problem, convict the American farmer of carelessness and want of knowledge, and the economic and political leaders of the people of unfaithfulness to their trust. To restore and maintain the fertility of the soil, to assure food and occupation for a greater population than may be expected in a long future, we have but to study the experience of older peoples and to follow lessons written plainly in the history of the world's agriculture.

ROTATION OF CROPS.

There are three essentials to any agriculture worthy of the name. The first is rotation of crops. Our low average yield is due to the antiquated system all too prevalent of raising the same crop indefinitely on the same land, until it has been worn out or so reduced that the owner is in danger of poverty. Even without fertilizers, the yield of a given area may be immensely increased and its productive powers preserved from exhaustion merely by the restorative variety of change, which seems to be ' a law of al! living things.

Some interesting facts have been brought out by the work of the Minnesota State Agricultural School. With only ordinary fertilization, and with such farm culture as could be applied to large areas, the average yield of wheat on the plots under experiment for seven years was *26.4* bushels per acre; of oats,

67.2 bushels; of corn, 42.8 bushels; and of hay, the average for five years was 3.91 tons per acre. This was accomplished merely by using a system of five-year rotation; the land being treated in this order: corn, wheat, meadow, pasture, oats. The figures given arc nearly double the average yield from the farms of the State. There is, therefore, no exaggeration in the .statement that our farm production could be made two-fold what it is by the mere application of more careful methods without any intensive cultivation whatever.

If the lands of the State were cultivated according to a seven-year system of rotation—grain, grain, grass, pasture, grain, oats, grain—without, fertilizers, it is estimated on good authority that the same amount of grain would be gathered during the four seasons in which it appears in this regular order as is now obtained from cropping grain every year. That, is to say, the farmer would obtain at the end of seven years exactly the same amount of grain that he now takes as the entire product of his fields; while in addition he would have the whole amount of other crops and of stock for which the three seasons of vacation from grain growing would furnish opportunity. Tie would, while preserving the fertility of his acres and guarding against soil deterioration, add three-sevenths to the volume of his material profits. Such is the promise of the simplest of all improvements in method.

ENRICH THE LAND.

This is but the beginning of agricultural possibilities. Calling in the aid of the second method of increasing yield and preserving soil productivity, which is a more liberal use of fertilizing material, such as is possible where farms are of small size and cattle are kept, there is abundant evidence of the extraordinary results that may be obtained. Illustrations may be found in every part of the country where individual small fanners have had the intelligence to put the system into effect. A recent report of the Department of Agriculture cites the case of a farm in Pennsylvania which was so exhausted as lo be incapable of production. This little tract of fifteen acres, devoted strictly to dairying and treated each year with every particle of the natural •fertilizers thus obtained, produces a revenue of about $3,000, or $200 per acre, annually. There is no secret in the process, ins!

as there is no uncertainty in the result. And by a combination of judicious crop rotation, which admits and requires diversification of farm industry, with careful fertilizing, the estimate of a doubled money value for the yield of the present farm area of the United States would be found under the mark.

INTENSIVE CULTIVATION.

The third factor in improvement, better tillage, is most interesting of all because it opens up unmeasured possibilities. We no more know what is the maximum food-bearing capacity of the earth or of any small portion of its surface than we do the rate at which people may be able to travel a century from now. But what has been done is sufficiently startling". It has been seen that a population of 45,000,000 people in Japan is supported on 19,000 cultivated square miles, aided by the food products obtained from the sea. This is because cultivation in Japan is truly intensive; that is, it is no longer even highly developed farming, but market gardening. As we approach that science, the actual creation of soils for growing purposes, the shelter of plants from frost and unfavorable elements, and the treatment of grains and vegetables by separate planting and individual nurture, all limitations upon earth's bounty appear to recede afar.

From two and seven-tenths acres in the suburbs of Paris there have been grown in a single season 250,000 pounds of vegetables. A market gardener of Paris declares that all the food, animal and vegetable, required for the 3,500,000 people of two great departments could be grown, by methods already in use, on the 3,250 square miles of gardens surrounding the city. Thus, while it appears that in Belgium a population of approximately five hundred persons to the square mile can subsist on the products of farm industry alone, this figure, by high intensive culture, such as becomes possible and profitable where population is extremely dense, might be more than doubled.

In one district of East Flanders a population of 30,000 peasants obtains its food from 37,000 acres of ground, at the same time raising thousands of beasts and exporting considerable produce. The farmers of the island of Jersey, by no means a paradise for the agriculturist, manage to obtain an annual

agricultural produce valued at about $250 from each acre of their land. In Germany they have produced thirty tons of potatoes to the acre. The same has been done in Minnesota; and might become the rule rather than the exception. The Japanese obtain their wonderful yields of rice, from twenty to thirty-two bushels per acre in poor provinces and sixty to sixty-seven bushels on the best land, by separate planting. After the plant has been started in a bed it is taken up individually and transferred to the field by hand.

Interesting[1] experiments have been made in the United States with wheat. If the best seed be selected and planted, and a vigorous young plant be grown, four inches distant from its nearest neighbor, it: is possible, with the most prolific varieties and the utmost care, to produce as high as one thousand five hundred grains of wheat from a single grain. A yield of one hundred grains would be a practical minimum. This would give one hundred bushels of crop for every bushel of seed; a multiplication now deemed incredible. By this method from sixty-two to ninety bushels of wheat to the acre have actually been obtained. The objection to the amount of labor required may be answered by the query whether it would be more difficult to grow ten acres after this fashion than a quarter section in the old way. And the food demand of a population growing by millions is soon to force such questions to the front. Even if the soil produces only the thirty bushels to the acre of wheat which ('.real; Britain can raise, a square mile would grow nineteen thousand two hundred bushels, if five hundred, persons were living on a square mile, it would allot to each one of them thirty-eight and four-tenths bushels as a supply. Distribute this in terms of any measured food ration and it will not be inadequate.

We may affirm with perfect confidence, as a conclusion of this brief investigation of soil preservation and development, that the possibilities of agriculture make it difficult to set any specific limit to the population that could sustain life on the produce of a given area. This, however, presupposes cultiva-tion as carefully studied and applied as are the details of manufacturing processes or the manipulations of a chemical laboratory. Such must be the ultimate goal of American industry. And although the American farmer need not yet become a market gardener, it is time to make a beginning of better methods.

FOOD FOR ALL

From the review given of actual accomplishment in treatment of the soil, from the promise of this most dependable; asset, something may be asserted with confidence of our own future. It can be shown that an average of two persons or more may be supported on every acre of tillable land, by the-highest form of intensive farming. But dismissing' this as unnecessary, it has been shown that a people like those of Belgium to-day, not an Oriental race accustomed to a standard of living[1] and of labor inapplicable to us, not living in virtual serfdom like that of Russia, but an industrious, fairly intelligent and exceedingly comfortable agricultural community, raise from the soil food enough for the needs of four hundred and ninety persons to the square mile.

Adopting- provisionally that ratio as a point of departure, though the actual ratio of area to population gives a figure considerably higher even than this, the 414,498,487 acres of improved farm lands in the United States on the date of the last official report, an area materially enlarged by the present time, would support in comfort 3T7,350,405 people; enabling them at the same time to raise considerable food for export and to engage in necessary manufacturing employments. Applying the same ratio to the entire acreage of farm lands within the United States, both improved and unimproved, which was at the same date 838,591,774, the population indicated as able to live with comfort and prosperity on the actually existing agricultural area of this country, under an intelligent system and a fairly competent but by no means highly scientific method of culture, rises to 642,046,823.

The conclusion is that, if not another acre were to be redeemed from the wilderness, if the soil were treated kindly and intelligently, if industry were distributed duly and popular attention were concentrated upon the best possible utilization of the one unfailing national resource, there would be produced all necessary food for the wants of, in round numbers, 650,000,000 people. But this means such study and labor to raise production 1o its highest terms as have entered scarcely at all as yet into the American comprehension.

QUESTIONS OF THE FUTURE.

Failing to understand the needs of the hour or to appreciate the moral to which they point, what fortune must await us? Within twenty years 125,000,000 people and before the middle of the century over 200,000,000 people must find room and food and employment within the United States. Where are they to live? What are they to do? By that time our mineral resources will have been so nearly exhausted that the industries related to them must fall into a minor place. By that time it is apparent that our dream of a conquest of world markets will be a bursted bubble. Mr. Harold Bolce has demonstrated that the peoples of the Orient, the hundreds of millions of Japan and China, with their imitative quality; their proved ability to operate modern machinery and *to* create it in their workshops after once using it; their enormous supply of coal and iron; their limitless cheap labor and their patience like that of Fate, art-prepared to control the markets of the future. They must control as against a policy which has established domestic conditions in manufacturing business on lines which make pro- duction so expensive an affair that we could not hope to meet the mechanic of Germany on even terms and must retire before the despised Chinaman.

It is a mathematical fact that within twenty years under present conditions our wheat crop will not be sufficient for home consumption and seed, without leaving a bushel for export. Will these coming millions go into the factories? But. where can we then expect to sell shop products in a world competition, and who will furnish the payrolls? All industry stops when these are not forthcoming. That is the, dead-wall against which England stands dismayed. The shops are there, the workingmen are there clamoring for employment, but capital can find no profit in the enterprises, nobody offers to advance money for the payrolls of unprofitable business, and a top-heavy industry must surely fall.

Let us be warned in time. On every side there is menace if our national activity be not reorganized on the basis of old-fashioned common sense. The safety valve for older peoples has been found in emigration. Their very relief has contributed to our danger. The United .States cannot follow their

example. **It** is against the genius of our **people;** and besides, the circle of the northern hemisphere is closed. At home the problem must be worked out; and its terms have been clearly stated.

A NATIONAL DUTY.

The conclusion reached points out and emphasizes a national duty so imminent and so imperative that it should take precedence of all else. Our foe is one that has overthrown civilizations as proud, as prosperous and far more strongly fortified than our own. Nothing can stop the onward march of nature's laws or close the iron jaws of her necessities when they open to crush their victims. Either we shall understand our situation and make such provision as her benignancy af- fords to meet it, or we shall meet conditions of overcrowding and artificial standards and food and employment inadequate to the national needs, and so be in danger of destroying the stately temple once reared with the highest hopes that ever animated humanity. Which is it to be?

If we arc to walk safely in the way of wisdom, there is much to be done. It is time to begin. There must be, first, a return to conservative and economic methods, a readjustment of national ideas such as to place agriculture, and its claims to the best intelligence and the highest skill that the country affords, in the very forefront. There must be a national revolt against the worship of manufacture and trade as the only forms of progressive activity, and the false notion that wealth built upon these at the sacrifice of the fundamental form of wealth production can endure. A clear recognition on the part of the whole people, from the highest down In the lowest, that the tillage of the soil is the natural and most desirable occupation for man, to which every other is subsidiary and to which all else must in the end yield, is the first requisite. Then there will be a chock administered to the city movement that lowered the percentage of agricultural labor to the whole body of per sons engaged in gainful occupations in the United States from forty-four and three-tenths in 1880 to thirty-seven and seven-tenths in 1890 and to thirty-five and seven-tenths in 1900. With public interest firmly fixed upon the future, the country, in mere self-preservation, must give serious attention to the practical occupation of restoring agriculture to its due position in the nation.

The government should establish a small model farm on its own land in every rural congressional district, later perhaps in every county in the agricultural states. Let the Department of Agriculture show exactly what can he done on a small tract of land by proper cultivation, moderate fertilizing and due rotation of crops. The sight of the Holds and their contrast with others, the knowledge of yields secured and profits pos- sible, would be worth more than all the pamphlets poured out from the government printing office in years. The government ought not to hesitate before the comparatively small expense and labor involved in such a practical encouragement of what is the most important industry of our present and the stay and promise of our future. Disseminate knowledge of farming as it should and must be, instead of maintaining the pitiful bribe of a few free seeds. Declare everywhere, from the executive chamber, from the editorial office, from the platform, and, above all, from every college class room and from every little school-house in the land, the new crusade. Let the zeal for discovery, for experiment, for scientific advancement that has made the last century one of multiplied wonders focus itself upon the problems of the oldest of sciences and arts; the corner stone of all civilization; the improvement of tillage and making grow two grains where only one grew before. Only thus may a multiplying population secure its permanent maintenance. Only thus may the struggle for existence that has power to either curse or bless be brought to any other termination than the peace of death.

A PICTURE OF REALITY.

I have not drawn upon fancy for a single detail of this picture. This growing increase of population, its rise to over 200,000,000 before 1950, the approaching exhaustion of much of our mineral wealth, the vanishing of our public domain, the deterioration of our soil, the terrible need which these must bring, the strain on institutions and the stress of industrial perplexity or decline arc as certain as the passage of the years. I have given you the facts, drawn from authentic sources, and in every case under rather than over stated. Let them be examined, criticised, compared with official records. For this

is not a controversy about theories, but a plain statement of natural facts in the light of nature's laws. Then let the states-men, the writers and the thoughtful workers of to-day say if they are not true. If true, what are we to Jo? Where, save in a concentration of national effort upon that first and last resource of man ever since he left Eden, is there a sure escape and a safe relief? Let the leaders of men give their answer.

TUB WAY IS OPEN.

The situation is not at all hopeless or even desperate if the nation turns to its task with appreciation, with wisdom and with courage. The saving qualities of the American people arc intelligence, adaptability and patriotism. Given a situation, simple or complex, demanding sacrifice or promising reward, they are quick to comprehend it and to mobilize their forces for its mastery. If they turn with comprehension of their situation manfully to the most vital work of the present, our children's for times may be made secure. Instead of a world filled with human beings struggling against advancing necessity, instead of the grim choice between the slow but sure decline to an ever-lowering scale of comfort, there appears a beautiful conformity to nature's order and the blessing of service to her law. This country may easily become what its people love to boast, the happiest and most favored portion of the earth, the sure refuge and defence of the destitute and oppressed, because of its mighty heritage of that one resource which may enjoy increase and replenishing as the ages roll by. This is not the conception of a new Arcadia or a re him of the golden age. Industry will sufficiently diversify itself, once the order of it is rescued from a false appreciation and restored to that found on nature's roll of honor.

In the last census year the value of agricultural products was less than $5,000,000,000. But the farm products of that year devoted to manufacturing uses were valued at $2,u'%i,ouo,-ooo; the product of the industries using these materials was $4,720,000,000; and in these industries, capitalized at over $4,000,000,000, there were 2,154,000 persons employed. A profitable husbandry is the very fountain from which all other occupations How and by which they are nourished into strength.

A symmetrical development of industry is by no means the least important reward of a readjustment of industrial occupations and interests in harmony with their real relation to man and his active life upon this planet. Not lessened hut enhanced and greatly varied industry in the end will follow the rearrangement and restoration of industrial values.

Now as ever, to the nation and race as to the individual, nature, the unrelenting; task-mistress of the centuries, holds out in one hand her horn of plenty and in the other her scourge. This country has brought itself within reach of the thong', while grasping at the satisfaction of present appetite and forgetting the primal relation between the earth and man. The pathway to prosperity is still open. The divinity of the earthly life at heart is kind. Under her rule there is work and abundant reward for all, but these must be won in her designated way and in none other. Tier pointing finger, that has never varied since man came upon the earth, shows the old and only way to safety and honor. Upon the readiness with which this is understood, the sober dignity with which a whole nation rises to. the winning of its broad and permanent prosperity, will depend the individual well-being of millions of this and many generations. Largely by this method will posterity, our fit and righteous judge, determine whether what issues from the crucible of this twentieth century is a bit of rejected dross to be cast aside or a drop of golden metal to shine forever upon the rosary of the years.

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