The
Duty of the Agriculturist
and
Is He Living up to It?

Thesis

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That agriculture is the most important of all industries, is universally recognized. This widespread opinion is founded upon the most unshakable of reasons. Man's subsistence being derived from the soil, its cultivation becomes imperative. Modern agriculture makes possible the existence of the human race in stupendous numbers. North America formerly supported only a few hundred thousand Indians; now it furnishes a home for nearly one hundred million people with wants much more various than were those of their forerunners. Yet the land is no more fertile—the change is over in whole or in different habits of industry. And still the development of the resources of this country has just begun. Especially is this true of agriculture. It is extensive now, but to support the rapidly increasing population, it will have to be made still more extensive, and not only that, but more intensive.

Thus it is seen the entire fabric of our civilization hinges upon this science. And if this
to true whatever tends to promote, vari-
and agricultural advancement, affects
in a similar manner and degree advance-
ment in civilization. When agriculture
is in a prosperous condition, the indus-
tries are likewise, and when agriculture
is impoverished in any way, a corresponding de-
lay is felt in other industries. As industries-
are the aggregate make up our civilization
and their practice makes it possible to sus-
tain it, the truth of the proposition that
that our very civilization itself de-
penent upon agriculture manifests
itself still more forcibly. As proof of this,
we may cite some of the results in the U.S.
of the last agricultural depression: The decline
of nearly one-half in applications for patents,
the diminished output and fall in price
of nearly all manufactured products, and
the idleness of money rather than its invest-
ment in new fields of enterprise, thus
deferring thousands of needy, from em-
ployment. Consequently, all trade and
occupations have been affected. It is true,
probably, that the state of agriculture did
not alone produce these results — the state
Of political vicissitudes undoubtedly had considerable influence. But I must
the less true, that had crops been abundant,
Tours would have been affected but little by the political situation. The soil failed
to give forth its usual abundance. Those products essential to human life, and
in consequence, all industries were un-
touched—chilled—checked at their
climax of their greatest activity in the world's
history, and so inundated that years will
probably elapse ere they regain their
former strength and activity. Other years
of depression could be cited with effect
just as barrenful and far-reaching as
this last one.

How to all thoughtful people, it is ap-
parent that if one or two seasons unf-
favorable to agriculture, react in such
an ominous manner upon other in-
dustries, a series of such seasons would
utterly destroy all business. Consequently
it is equally true, that anything, though
apparently trivial or unimportant, that has a
tendency to affect agriculture, has a cor-
responding effect upon all other industries.
It matters not what the cause may be — within the result of man's effort, or nature; the result is the same. In fact, agriculture balances all other industries.

Having shown the importance of agriculture in civilization, we will now see if the state of American agriculture, especially in Kansas, is what it should be if the rank and file of agriculturists are awake to the importance of their avocation.

If our preceding arguments are true, the duty of the farmer is a grave one. He must do all in his power to make his piece of land produce its accustomed amount of products annually. The agricultural depression just mentioned was produced by uncontrollable forces principally of nature. But there are forces just as formidable, just as benevolent, which are wholly within man's power to prevent. And it is only a question of a few years — a few decades at the most — when farmers will be compelled to change some of their meth
ode to in order to avert some calamity. The most glaring of these wrongs, and the only one which we shall touch upon in this paper, is the continued cropping of land, generally ignoring rotation, and also making some regular return to the soil of those fertilizing elements removed with each crop.

To the patriotic citizen, each individual should observe that principle laid down in the preamble of the Constitution of the United States, to the effect that not only should we make provision for our own blessings, but also for blessings for our posterity. This is truly a noble sentiment. It is only an extremely selfish, ignorant individual who would voluntarily not only do that which would work injury to himself, but also, to his posterity. This applies to all individuals and especially to The Farmer. It lies within his power to sustain as he finds it, improve, or do irreparable injury, to the domain which exists only to a limited extent. Pure antiseptic virtues may be extended indefinitely, commune may fly betwe
The continent until the very sea itself is changed into foam by the propellor of the ocean steamship, other trades and industries know no bounds, but tillable land, lying within the boundary of the tillable domain, agriculture will always if necessity be restricted within definite limits. That the farmer's duty is an important one, will be admitted without further argument. Let us see if he is doing it.

The American farmer received as a gift a piece of land rich in the accumulation of mold the result of the decay of vegetation for ages. The truth of the latter part of this proposition becomes apparent especially to Kansas, when it is observed the depth to soil has accumulated in the eastern part of the state, where, because of the and climate, the annual vegetation is very slight, and some seasons there being none at all. Kansas being of almost level prairie to breaking the land is an easy matter. In cleaning away of timber or rocks unnecessary
Consequently the breaking flows with little obstruction. If a farmer possesses 100 acres, he probably provides for cultivation at least 100 acres of it, and quite frequently much more. Occasionally whole sections are subjected to the breaks, only enough being left unbroken to furnish pasture and hay for the two employed in the work. In western Kansas, the land thus broken is, the most of it, seeded to wheat. Other crops do not pay well. It is wheat, wheat, wheat, continually, there.

As soon as rape, self-binders harrows are put in, it is then immediately chaffed within a couple of weeks, it is ready for the Thresher. and then the greater part of it is dumped into cars and shipped to the wheat markets. This same routine is followed year after year. This wears down of those elements taken from the soil are returned to it, as is partially the ease in corn districts where a good portion of that product is fed to stock. The wheat grower does not rotate crops.
because he cannot successfully grow any other—what is the only paying crop. He gets the most money for it now. And if he bought land in the early days, as is often the case, the land cost him but little. Consequently he argues if he does not use it, it will be after he has derived from it several times its cost price, it amounts nothing to it either in the shape of artificial fertilizer, or by yard manure. The former is too costly, the latter he can furnish only in limited amounts, as he keeps so little stock. The result is a continuous drain upon the soil that in time can but totally exhaust it.

Let us see what is annually taken from the soil. A crop of wheat of 33 bu. to the acre removes 150 pounds of ash residues—44 pounds in the seed, and 100 pounds in the straw. A bale of two tons carries off 2600 pounds of ash ingredients. The weight of an average losing soil is 4.000.000 pounds per acre for each foot in depth. This apparent then, that what is taken from the soil,
is but a small fraction of its total weight — 1 - 30,000 and 1 - 57,000 of its total weight. Tschirnhaus experiments give results from which we conclude that 4.5 pounds of potash, 17 of soda, 17 of magnesia, 23 of lime, 6.5 of phosphoric acid, 11 of sulphuric acid, 5 of chlorine, and 5.4 of nitrogen, are all that would be maintained in soluble condition in 1,000,000 pounds of soil in order to establish this fertility equal to the production of 33 bushels of grain and 2,000 pounds of straw per acre. In other words, the 140 lbs. of ash elements may be taken from 1,000,000 lbs. of soil in which but 1.56 lbs. exist in soluble condition, and in which, therefore, the proportion of real plant food—nitrogen, exclusion of water, but one part in 1000, but rarely more — perhaps than ten times that amount. Our rich prairie soils would undoubtedly be cleared with the last named. But now, if it is evident that in an ordinary lifetime, if continually seeded to one crop, and no return made to the soil, that this bore mentioned of ingredients would be so
Reduced, that ultimately a paying crop would hardly develop at all.

The western farmers generally, labor under the impression that prairie soil is practically inexhaustible. He probably got this impression from his own experience of from ten to thirty years in the state. In that time it may be he has noticed no decrease in yield from continually planting the same field to the same crop. If he detects any difference in yield, he probably attributes it to some other cause—a dry weather or chinty bugs, it may be. In fact from numerous inquiries we are led to believe that a great many western farmers hold to this idea. And their manner of farming further goes to prove the prevalence of the idea. That it is erroneous is apparent to anyone who has bestowed any thought or study upon the matter. If further evidence is wanted, history can furnish it in abundance. Mr. J. W. Johnson says theoretically it is impossible to produce a maximum crop of any given kind, continually and perpetually upon the
same plot of land. In practice, however, it is rare and therefore far better to alternate or rotate crops. But in practice the first part of this proposition fails to work out. If proved out, the maximum crop of corn does not pay for the cultivation of the land. In the old tobacco districts of the southern states, immense tracts of land formerly the richest and consequently producing immense crops of that staple, are now abandoned as worthless, being so impoverished as to produce very insignificant returns now.

In the New England states it has been recognized for years that without the employment of some fertilizer, very light crops can be harvested. The same thing is true in Denmark, Holland, Belgium, and all other long settled countries. Though the farms are small, often consisting of but a good sized "corn patch", they are regularly treated to a dressing of manure. It is a proverb with them: "No manure, no corn."

This is no better evidence that continuing will ruin land, than the example
experience given above. If scientists did not infer the same results from their studies and experiments. An authority says: "Soils, when reduced in fertility from continuous removal of soluble matter by cropping, may be stored in production wiser by being fallow, atmospheric and mechanical agencies thus bring into solution enough ashing nitrate for a new crop." Another authority says: "It has been a long-established fact in agriculture, that the greatest return from the soil is generally secured, not by continuous growing one plant crop through it command. The highest market price, but by an alternation or rotation of crops. This is no difficulty in cultivating many agricultural plants successively for any length of time on the same ground, provided enough be expended in putting the soil in the right chemical and physical condition. Plants may be divided into four classes as to their different demands on the soil.

1. Enriching

2. Non-exhausting
3. Exhausting
   Cereals, beets, turnips, carrots, potatoes.
   4. Very exhausting
      Tobacco, flax, hemp, and hemp.

From the above table we see that western farmers continually grow only exhausting crops — cereals, turnips, and potatoes. Generally, clover will not grow, so it is not possible to enrich from that source. Thus, the western farmer will have to adopt some other method of enriching the soil. For he may rotate with wheat, oats, and rye, but still by sodorogic, it is still within the exhausting crops.

Another necessity for keeping up the fertility of the soil is brought out by the following from the pen of a well-known agriculturist: "organic matter (humus) occurring in available soils in quantities from 3 to 10 per cent is of great value, not only from the fact of its absorbing water, but also, that in its decay, it is a continuous source of carbonic acid and ammonia—thus satisfying became extenuating condition of rapid growth—supply of atmospheric
plant food by the soil. Hence, over-nourished soils have less capacity for moisture than those rich in humus. This may be the reason—our reason—for the apparent increase of dry weather in the western part of our state. Mr. F. C. Sturton, in a paper read before the Wisconsin Agricultural Society, thus speaks of the over-nourished soils of that state: "If we plow well cultivated soil we will find it loose and pliable; the over-nourished or unworked soil, we find hard and heavy—it has not that loose and firm the appearance of well cultivated soil. The over-nourished soil requires much more labor to reduce it to the necessary condition to receive the seed, not only this, but we find that drought has a much worse effect upon our unworked soil, than it does upon the over-nourished. Droughts were severe and frequent when we first settled here as they are now, but I have no remembrance of failure to produce a good crop from that cause, while our soil was new, but late years, we find we must have frequent and regular rain, or crops will quickly shatter."
This same writer goes on to show that the farmers of the section of Wis., are divided into two classes — the well-to-do, and the poverty-stricken, and the latter are invariably found upon the worn lands. They have not the means to buy fertilizers, and so things remain as they are from year to year. He says further, "There is no doubt that our over-cropped lands, without manure or man, by lying to grass, have become in a great measure, destitute of plant-food, and this destitution has also thrown it out of its mechanical condition and robbed it of its ability to withstand a drought." And I wish to emphasize the point brought out by the writer that the ability to withstand a drought is destroyed by continued cropping. Of anything particularly needed in Kansas, it is more abundant moisture. Of late years rain seems to be far scarcer than it usually is. In the early '70's, Kansas earned its name — drought Kansas." Later, after the prairie sod was broken up, this meager moisture is accumulate, and in it, dry weather was little felt. But of late years dry weather has become
much worse, until now—no crop is sure in Kansas. The writer remembers when cotton was considered a crop that would never fail. For fifteen years, no failure was known. But within the last four years there have been several nearly total failures. Do not this something in the Kansas' continuous cropping of land that aggravate the effects of dry weather?

Mr. Curtis says still further on the general bad effects of this practice: "This overcropping of land to grain without rotation or some return to the soil, is ruinous in the extreme, and will sustain complete ruin unless a radical change is made."

Another writer says: "What would be thought of a farmer who should keep his horse up on muscles and feed to sustain life, but not sufficient to impart that physical strength requisite in tilling the soil, or doing other farm work, and thus reduce his ability to perform his daily toil? He would be called an inhuman taskmaster or a fool. But and he who knowingly robs the land of its producing power, without using reasonable means within his reach to restore it, equally
endurable, shortsighted, and unwise, and will not the judgment of the Senator in the shape of poverty at least, sooner or later overtake him? Nature teaches us wise and valuable lessons. A single glance for a moment at her natural farming operations, and see if some particular hints cannot be obtained worthy of our imitation. In her economy, nothing is lost, and a careful observation has taught me, that the means she can be followed in the use of her economy in the natural products of the earth, the less waste there will be, and hence, the more successful and remunerative will be the labors of the husbandman.

The soil of our state in its natural condition is rich in all the elements of fertility, and its natural products of grasses and soapthorn constantly increase its strength and productive power. The grasses grow luxuriantly through each successive season, fed by the fertilizing properties of the soil adapted to their wants, and in due season return to the soil, producing a vegetable mold, which...
enriches and strengthens it, so that a more vigorous plant follows the ensuing year. Thus nature produces natural products, returning each year all she produces, except the increased growth of the tree, and the increased weight of the animal which fed upon her product, and they too, after having fulfilled the mission for which they were created, return to the earth. Those elements of which they are composed, to be again converted into plant food. Of necessity, by her system of farming, continually increases. The fertility of the soil, cannot we help up the condition as we find it? We can, and it is our duty and true economy to do so.

As this winter, especially the high prairie, cannot raise clover, he cannot meet his landlord paying under green crops, or by having it his fellow. But his best method is by the application of manure. Of necessary, he must keep more stock—sincerely support it, by cutting all his corn as soon as it is cut. This winter. It is said" manure belongs to the farmer—it is a part of the bank account which, if allowed to escape, is just so much capital withdrawn and upon which no interest will accrue. It is the debris of vegetation and contains all the essentials of plant growth. If you have
raised a crop of wheat or other product, return at once to the soil, or compost heap, that part un-fit for use. By this course, nothing is lost except the increased weight of the animals to which it was fed. These animals, thus fed, are soon in a condition to support a higher type of life, to wit, man, when the same care should be observed to save every particle of the concentrated constituent of plant food. With an economical system of farming in Kansas, now if these constituent elements of the soil ought to be lost, except those contained in grain and stock, shipped to eastern markets for consumption. Sure, if not for this, some artificial fertilizer will have to be supplied from these large cities." I have quoted at length from the writer, because I believe his ideas are just what our farmers should put into practice. But I would go still further, and just all organic except, of course, what would bring a good price. By so doing, all loss would be permanently taken from the soil.

I have treated this topic at length because I believe it is to the root of the western farmer. Farming implements are so cheap now,
so complete, that the soil normally worked and pulverized sufficiently. Of course there are a few slack, indifferent farmers, who do not recognize, much less practice thorough culture. But they are in the minority.

To get our farmers generally to recognize the importance of regularly applying manures, and rotating crops, will probably be a difficult matter. Much can be done, by the dissemination of good agricultural literature. Farmer's Institutes can also make their influence felt. But our agricultural colleges and Experiment stations can do more than either. From the stations, bulletins touching upon various experiments, are sent out regularly. From the colleges, scholastic annually many young men who have had the facts inculcated into their minds. Sending in different parts of the state, their influence cannot but be felt—Their methods will be adopted by neighboring farmers—agriculture will be carried
in to better advantage and in accordance with nature's economic laws. If these improved methods become universal, the state of agriculture will be greatly improved—consequently the condition of all industries—therefore general prosperity. And all because the farmer is doing his duty. Then will there be no danger of wholesale abandonment of farms because of inproductiveness. But civilization will continue to advance. Posteriority will not be denied of its rights to the soil. But future generations will bless their predecessors in that they acted with wisdom, and handed down a heritage unimpaired by centuries of use.