The Duty of the Agriculturalist and Is He Living up To It.

Thesis

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1895.

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That agriculture is the most important of all industries, is universally recognized. This wide spread opinion is founded upon the most unshakeable 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 varied than were those of their predecessors. Yet the land is no more fertile — the change is owing wholly to 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 the science. And if this

be true, whatever tends to promote, or retard agricultural advancement, affects in a similar manner and degree advancement in civilization. When agriculture is in a prosperous condition, other industries are likewise, and when agriculture is injured in any way, a corresponding feeling is felt in other industries. As industries in the aggregate make up our civilization, and their practice makes it possible to sustain it, the truth of the proposition that that our very civilization itself is dependant upon agriculture manifests itself still more forcably. As proof of this, we may cite some of the results in the U.S. of the last agricultural depression: The decrease of nearly one-half in applications for patents, the diminished out put and fall in price of nearly all manufactured products, and the idleness of money rather than its investment in new fields of enterprise, thus depriving thousands of needy, from employment. Consequently, all trades and occupations have been affected. It is true, probably, that the stock of agriculture did not alone produce these results — the state

of political uncertainty undoubtedly had considerable influence. But it is nevertheless true, that had crops been abundant, times would have been affected but little by the political situation. The soil failed to give forth in its usual abundance those products so essential to human life, and in consequence, all industries were unbalanced — chilled — checked at the very climax of their greatest activity in the world's history, and so injured that it will probably elapse ere they regain their former strength and activity. Other periods of depression could be cited with effects just as baneful and far reaching as this last one.

Now to all thoughtful people, it is apparent that if one or two seasons unfavorable to agriculture, react in such an ominous manner upon other industries, a series of such seasons would utterly destroy all business: consequently it is equally true, that anything, though apparently trivial in its nature, that has a tendency to affect agriculture, has a corresponding effect upon all other industries.

It matters not what this cause may be—whether the result of man's effort, or nature's; 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 agriculturalists 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—those of nature. But there are others just as far reaching, just as baneful, which are wholly within man's power to prevent. And it is only a question of a few years—a few decades at the furthest—when farmers will be compelled to change some of their meth-

ods, in order to avert some calamity.

The most glaring of these errors, 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, or 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. Mercantile ventures may be extended indefinitely, commerce may ply between

the continents until the very sea itself is churned into foam by the propellers of the ocean steamships, other trades and industries know no bounds; but tillable land, lying within the boundaries of the tillable domain, agriculture will always of 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 Kansans, when it is observed the depth to which soil has accumulated in the western part of the state — where, because of the arid climate, the annual vegetation is very slight, and some seasons there being none at all. Kansas being of almost level prairie to break up the land is an easy matter. No clearing away of timber or rocks is necessary

consequently the breaking plow meets with little obstruction. If a farmer possess 160 acres, he probably prepares for cultivation at least 100 acres of it, and quite frequently much more. Occasionally whole sections are subjected to the breaker, only enough being left unbroken to furnish pasture and hay for the teams employed in the work. In western Kansas, the land thus broken is, the most of it, seeded to wheat. Other crops do not pay now. It is wheat, wheat, wheat, continually, there. As soon as ripe, self binding harvesters are put in; it is then immediately "shocked" 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. Thus none of those elements taken from the soil are returned to it, as is partially the case in corn districts where a goodly portion of that product is fed to stock. The wheat grower does not rotate crops,

because he cannot successfully grow any other - wheat - is the only paying crop. He gets the most money for it now. And if he bought land in the early days, as in often the case, the land cost him but little. Consequently he argues if he does ruin it, it will be after he has derived from it, several times its cost price. So he returns nothing to it either in the shape of artificial fertilizers, or barnyard 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 140 pounds of ash elements - 40 pounds in the seed, and 100 pounds in the straw. A hay crop of two tons carries off 260 pounds of ash ingredients. The weight of an average loamy soil is 4.000.000 pounds per acre for each foot in depth. It is apparent then, that what is taken from the soil,

is but a small fraction of its total wright — 1–30,000 and 1–57,000 of its total wright. Heiregal's experiments give results from which we conclude that 55 pounds of potash, 17 of soda, 17 of magnesia, 230 of lime, 55 of phosphoric acid, 11 of sulphuric acid, 8 of chlorine, and 54 of nitrates, are all that need be present in soluble condition in 1,000,000 pounds of soil in order to establish that a fertility equal to the production of 33 bushels of grain, and 2000 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 156 lbs exist in soluble condition, and in which, therefore, the proportion of real plant food — nitrogen, exclusive of water — is but one part in 4000, but rarely more perhaps than ten times that amount. Our rich prairie soils would undoubtedly be classed with the last named. But even then it is evident that in an ordinary lifetime, if continually sucked to one crop, and no return made to the soil, that the above mentioned ingredients would be so

reduced, that ultimately a paying crop would hardly develop at all.

The western farmer generally, labors under the impression that prairie soil is practically inexhaustable. He probably gets this impression from his own experience of from ten to thirty years in the state. In that time it may be, he has not tied 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 — dry weather or chinch 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 any one who has bestowed any thought or study upon the matter. If further evidence is wanted, history can furnish it in abundance. Mr. S. W. Johnson says "theoretically, it is possible to produce a maximum crop of any given kind, continually and perpetually upon the

same plat of land. In practice, however, it is rarely and therefore far cheaper to alternate or rotate crops". But in practice the first part of this proposition fails to work out. If proved out, the maximum crop often 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 crops 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 "truck patch", they are regularly treated to a dressing of manure. It is a proverb with them: "No manure, no crop."

There is no better evidence that cropping will impoverish land, than throughout

experience given above. Yet scientists deduce the same results from their studies and experiments. An authority says: "soils, when reduced in fertility from continued removal of soluble matters by over cropping, may be restored to productiveness by lying fallow, atmospheric and mechanical agencies thus bring into solution enough ash ingredients for a new crop." Another authority says: "it has been a long settled fact in agriculture, that the greatest return from the soil is generally secured, not by continuously growing one plant even though it command the highest market price, but by an alternation or rotation of crops. There is no difficulty in cultivating any agricultural plant 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
   Clover, Lucerne.
2. Non exhausting

Peas, beans, cereals cut green.

3. Exhausting.

Cereals, beets, turnips, carrots, potatoes.

4. Very exhausting

Tobacco, flax, hemp, and hops.

From the above table we see that western farmers continually grow only exhausting crops — cereals, turnips, and potatoes. Gradually, clover will not grow, so it is not possible to enrich from that source. Then, the western farmer will have to adopt some other method of enriching the soil. Now he may rotate with wheat, oats, and rye, but still by so doing, is 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 agriculturalist: "organic matter (humus) occurring in arable soils in quantities from 3 to 10 per cent is of great value, not only from the fact of its absorbing water &c, but also, that in its decay, it is a continuous source of carbonic acid and ammonia — thus satisfying to some extent our condition of rapid growth — supplies of atmospheric

plant food by the soil. Hence, impoverished soils have less capacity for moisture than those rich in humus. This may be the reason — one reason — for the apparent increase of dry weather in the western part of our state. Jno. F. C. Curtis, in a paper read before the Wisconsin Agricultural Society thus speaks of the impoverished soils of that state:- "If we plow a well cultivated soil we will find it loose and pliable; the impoverished or overcropped soil, we find hard and lumpy — it has not that loose and friable appearance of well cultivated soil. The impoverished 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 worn out soil, than it does upon the unimpoverished. Droughts were as 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 show it."

This same writer goes on to show that the farmers of this 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 rest, by sudding to grass, have become in a great measure, destitute of plant food, and this destitution has also thrown it out of 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 drought is destroyed by continued cropping. If anything particularly is needed in Kansas, it is more abundant moisture. Of late years rain seems to be less abundant than it usually is. In the early '70's, Kansas earned its name — "drought-Kansas." Later, after the prairie sod was broken up the enabling moisture to accumulate 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 oats were 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. Is not there something in the Kansas continuous cropping of land that aggravates the effects of drouth?

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 indeed complete ruin unless a radical change is made". Another writer says: "What would be thought of a farmer who should keep his horses upon just enough 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 wretch or a fool. But is not he who knowingly robs the land of its producing power, without using reasonable means within his reach to restore it, equally

culpable, shortsighted, and unwise; and will not the judgment of the creator in the shape of poverty at last, sooner or later overtake him? Nature teaches us wise and valuable lessons. Let us 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 more she can be followed in the system 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 so forth, have constantly increased its strength and productive power. The grasses grow luxuriently through each successive season, fully the fertilizing properties of the soil adapted to their wants, and in due season return to the soil, producing a vegetable mold, which

richer and stronger soil, 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 animals which feed upon her products; 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. If nature, by her system of farming, continually increases the fertility of the soil, cannot we keep up the conditions as we find it? We can, and it is our duty and true economy to do so."

As the western, especially the high prairie farmer, cannot raise clover, he can recruit his land by plowing under green crops, or by leaving it lie fallow. But his best method is by the application of manure. If necessary, he must keep more stock — he can easily support it, by cutting all his corn as is done farther east. It is said "manure belongs to the farm — 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 ever 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 unfit 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 constituents of plant food. With an economical system of farming in Kansas, none of the constituent elements of the soil ought to be lost, except those contained in grains, and stock shipped to eastern markets for consumption. In return for this, some artificial fertilizer will have to be supplied from these large cities." I have quoted at length from this writer, because I believe his ideas are just what our farmers should put into practice. But - I would go still further, and feed all grain except, of course, wheat, when that would bring a good price. By so doing still less would be permanently taken from the soil.

I have treated this topic at length because I believe it to be the root of the western farmer. Farming implements are so cheap now and

so compkte, that the soil is usually worked and fulverized suppiciently. Of course there are a few slack, indiffernt farmers, who do not recognize, much less practice, thorough culture. But they are in the minority.

To get our farmers gnerally to recognize the importance of regularly applying manures, and rotating crops, will probably be a diffecult matter. Much can be done, and is done, by the dissemination of good agricultural literature. Farmers 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 scatter annually many young men who have had the facts laid down in this paper, thoroughly instilled into their minds. Settling in different parts of the state, their influence cannot but be felt — Their methods will be adopted by neighboring farmers — agriculture will be carried

on to better advantage and in accordance with natures economic laws. If these improved methods become universal, the state of agriculture will be greatly improved — consequently the condition of all industries — thus producing general prosperity. And all because the farmer is doing his duty. There will then be no danger of a wholesale abandonment of farms because of unproductiveness. But civilization will continue to advance. Posterity will not be deprived 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.