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[From the Wilmington Journal.

The Science of Farming.

An Address Delivered before the New Hanover County Agricultural Society, and published at their Request.

BY PROF. GRADY.

Mr. President and Gentlemen of the New Hanover county Agricultural Society:

If I had been controlled by merely personal considerations, when I was honored by an invitation from your Executive Committee to be present on this occasion and give you my views on some appropriate subject which I might select, I should have been compelled to decline. But the interest I feel in the advancement of Agricultural Science, and my earnest desire to do anything I can in furtherance of the designs of such Societies as this, were motives too powerful to be disregarded.

The New Hanover county Agricultural Society has taken a high stand among the patriotic institutions of the State, and we may reasonably hope that it will achieve a success worthy of the patriotism and intelligence of the gentlemen to whom its interests are entrusted.

Differing from those associations of former years, whose chief purpose was the development of mere skill in the management of farms, and the only public evidences of whose existence were the annual county fairs, this Society has based its efforts on the all-important truth that *is it impossible to make useful changes in the operations of any art without a knowledge of the reasons for those changes.* And this is the right step in the right direction. It is taking hold of the subject in the true spirit of philosophy.

Within the natural world nothing happens without a cause; there is a reason for everything, and when we know the reason we have a truth which makes us "free indeed." Thus it is with the school boy, after he learns *why* a rule is true, he has no difficulty in remembering the rule, and if the farmer knew *why* he plows he would always know *when* and *how* to plow, and we should have no more controversies about deep and shallow plowing. So, in all the operations of the farm; and it is manifestly the first duty of the husbandman to acquaint himself with all the scientific principles which he needs to apply to his business

Every art has its science, and there is no one of physical sciences which does not explain the principles whch iunderlie one or more of the arts. But it is difficult for the farmer to learn this fact, because scientific questions are generally discussed in a language which he does not understand, and they are confined chiefly to Literary Societies, and to those Seminaries of learning whose purpose is to divert the best talent of the country from industrial pursuits. He feels, too, that they are beyond his comprehension, and he consoles himself with the fact that he has lived thus far without troubling his brains about oxides or acids. But here is his mistake. All science is common sense when divested of its perplexing nomenclature; it is simply an explanation of the operations of nature going on round about us; it gives the reasons, and without knowing some of these reasons it would be impossible for us to conduct the most ordinary business. Every farmer, then, is, and must be, a philosopher to some extent. Science, I repeat, is common sense, and it would not be difficult to have our people instructed in all they need to know in the management of their farms. With Agricultural Societies in every neighborhood, and proper efforts made to simplify all these laws and conditions, a knowledge of which is indispensible to any solid improvement in the modes and means of farming, we might hope to see our people take a fresh start in material prosperity, and our political degredation would soon be forgotten. We need a Leibig to take this matter in hand and the combined efforts of our wise men to push it forward. Until something of the sort is done, we can never expect any spirit of improvement to be infused into our farming population. It is useless to propose new and better modes of conducting one's business unless the reasons be given—and given, too, in language which can be comprehended. Many a valuable suggestion has been treated as idle speculation simply because it was not accompanied by any explanation which the unscientific could understand, and nearly all the attempts that have been made in our country to adopt the improved methods of other countries have proved abortive, because we did not know the scientific principles on which they were founded. The use of lime as a fertilizer has been condemned after one year's trial on a worn-out field where there was nothing for it to act upon except the seeds that were planted, and deep plowing has gone into disrepute after a similar experiment.

It is customary with the more sanguine friends of progress to berate the farmers for the tenacity with which they cling to the customs of their fathers; but this is unreasonable. No man will reject an improvement if he knows not only that it is an improvement, but the reasons why it is. The blame belongs, if to anybody, to those who have it in their power to devise means of enlightening the people. Knowledge is what the farmer needs, and when he gets that, there will be no further reason to chide him. We must inspire him in the first place with hope, by assuring him that improvement is possible; and this, perhaps, is his most difficult lesson. He must then be convinced that there has been no general improvement in the agriculture of any country without the previous study of the laws and conditions of vegetable growth. He will then become a reader, a student, a thinker; and he will soon learn that in his business as in all others, "Knowledge is power." To this position I earnestly desire too see our farmers elevated. Such a consummation is worthy of the best efforts of every lover of his country. The patriot, no less than the philanthropist, is interested in this matter. The failure of our attempt to maintain free government was due, in a great degree, to our agricultural inferiority, and we shall ever remain unable to cope with other nations, either in physical or intellectual contests, so long as we neglect this most important branch of industry. Every interest of the country depends on the productions of the soil. No man is a good citizen whose barn is empty; and no man who makes one barrel of corn per acre is capable of being either a Christian or a philosopher. He can have neither time nor taste for moral and spiritual growth or intellectual culture. It is a fatal mistake to suppose that the farmer need not be educated. He, of all men, needs all the light which science can throw on the phenomena of nature. Subjected every day of his life to the conveniences or inconveniences growing out of the unerring operation of Nature's forces—being compelled, if he would succeed, to accommodate his labors to her requirements, it is surely of the greatest moment to him to acquaint himself with all those laws and conditions which control the growth and preservation of his crops. Indeed, the farmer has need of more varied knowledge than any other man in society. There is not a single one of the sciences from which he cannot draw useful lessons. He should understand the principles of organic composition and decomposition, the structure and functions of all the organs of plants and animals, and the nature and influence of heat, light, electricity, of moisture and of the atmosphere. And the study of these things will not only benefit him materially, but he will derive new and unexpected pleasure from the expansion of his mental powers, and the exaltation of his conceptions. He will find himself gradually entering a new world of thought and feeling, surrounded on all sides by the glories of God, as displayed in the beauty and order of the material creation.

But the most deplorable consequence of our agricultural poverty is our inability to provide the means of educating the rising generation—making men and women of them who shall be worthy and useful citizens of the country, able to exercise a controlling influence in future legislation. Contests for political supremacy have already begun, and our children will inevitably be overpowered finally, unless we arm them against such a fate. *Wise men govern the world*, and it depends on us to determine whether our posterity shall govern North Carolina, or give it up to impudent vagabonds from New England.

I repeat it, then, every motive which can influence the heart of the patriotic demands that something be done to improve our system of farming. We need Agricultural Schools, Agricultural Clubs, Agricultural Lectures, and liberal attention to experiments; and although we cannot do everything at once, we ought to set about doing what we can. Agricultural books and periodicals are constantly telling us of the success attending experiments in other countries, and it is surely in our power to try some of them here.

Let us not despair as some of our soldiers did who saw the wheat fields of Pennsylvania. "Our lands," they declared, "can never be made as rich as those of Pennsylvania," and when told that the lands of England are equally as fertile as those of Pennsylvania, although forty years ago they were as poor as ours, they still insisted that there must be a difference in some respect.

No, let us not be discouraged, but go vigorously to work to ascertain by experiments the necessities of our soils, feeling assured that our lands are as good as any in the world. And among the experiments, it seems to me well worth our while to endeavor to discover some other crop suited to our lands, as well as corn and cotton.

Of the many interesting subjects connected with farming, which are worthy of thought and investigation, I have selected one for your consideration on which very little has ever been written—it is new—and though it may appear to be a matter of mere scientific curiosity, I have no doubt it will acquire a practical importance when thoroughly understood. Indeed, there is no such thing as a scientific curiosity. Every fact in nature, every principle and legitimate inference bears a useful relation to the necessities of man.

I propose to inquire into the functions of stems and vines in the vegetable kingdom, and if I shall succeed in rendering the subject as interesting to you as it has been to myself, you will agree with me as to its importance. The investigation was suggested to me by a statement in Landreth's almanac that the largest Irish potatoes planted whole will produce a heavier crop, than an equal weight of small ones or eyes will produce.

Nature is continually putting at us questions of this sort and inviting us to the study of her plans and forces, and although she seems rather exacting sometimes, her generosity always exceeds her demands, for every vigorous effort to pry into one of her mysteries is sure to open up to us new fields of thought and investigation, and to give us not only a fondness for such studies, but courage for their prosecution. And herein she differs from human teachers. She makes no demands on our faith; she shows us the evidences of her declarations; proves everything as she proceeds; asks nobody to believe what is not proved; and, to crown all, when she has led us through one of her apartments we see no smack of self-complacency, but a kindly anxiety to show us further beauties.

Before proceeding to my subject, I must ask you to bear in mind the interesting fact in vegetable physiology that the carbon, or charcoal, which constitutes nearly all the solid parts of trees and plants, enters them through their leaves in combination with oxygen gas. This fact, it is true, has been seriously objected to, but the evidences on which it rests can hardly be overthrown. Vegetation, in the very nature of things, must have preceded animals in the order of creation, and it is quite certain that the first trees and plants grew on a barren soil.

The principal office of stems and vines is to receive and elaborate the *food* which enters them through the leaves and roots, and apply it either to their own enlargement, or the production of fruits and seeds.

In searching for proofs that this is their true function, I have found them abundant and conclusive, and I am no little astonished that the subject has not been investigated before. The cabbage stalk, after it gets grown, is filled with nutricious matter which is expended the following spring in the production of sprouts, flowers and seeds. The "ribbon" or Louisiana sugar cane bears no seed. The stalks are planted and sprout at every joint, the young plants living for some time on the sugar in the parent stalk.

In the corn stalk there is deposited a large quantity of saccharine and glutinous matter which is expended in suckers, tassels and ears, and the same remark applies to wheat, rye, oats, &c., and to the grasses.

In the stems and vines of potatoes, turnips, onions, &c., the nutrient matter passes mainly into the roots; hence sweet potatoes continue to grow after frost kills the leaves and until the vines are dry. In some fruit trees it requires one year to store away nourishment enough to produce one crop of fruit; hence they bear every other year.

In all these instances and many others of equal interest, which could be mentioned, the growth of fruit retards that of the stem, and the growth of the stem prevents a full yield of fruit. The farmer recognizes this truth when he tops his Irish potatoes, bruises his sweet potato vines, suckers his corn, and checks the growth of his melon vines; and so does the fruit grower in keeping his trees pruned.

The process is simple and beautiful and cannot fail, when thoroughly understood, to suggest some valuable improvements in farming and fruit raising.

To make the subject still plainer, and prepare the way for a few practical remarks, I will give an illustration: The nutritious matter which enters a corn stalk, e. g., is disposed of in two ways: One part is converted into cellular substance and the other is deposited in the cells as fast as they are formed There it remains, under favorable circumstances, until the [illegible] tents to produce the tassel, shoots and ears, after which, as every one knows, the stalk is dry and tasteless. It often happens, however, that the lower joints of corn in their haste to discharge their contents, put out suckers, and it is a question of some interest whether this can be prevented, and it is worth an experiment to ascertain whether, if let alone, the suckers would not increase rather than diminish the yield of corn. Some farmers maintain that they will.

The first practical lesson which this subject teaches, is that others things being equal, the largest stems and vines always produce the most fruit; the second is that annual plants which have the earliest and most vigorous start always do best, because their stems and vines grow largest, contain more nourishment, and have more time to put it into their seeds or roots; the third is that fruit trees ought to be hastened in their growth and forced to attain their maximum size before being allowed to bear fruit; the fourth is that grasses intended for hay should be mown just when they get their growth, and before any of their nutritious matter is gone into the flowers and seeds; the fifth is that of removing the blades and tops from corn before they are thoroughly dry, diminishes the weight of ear; the sixth is that we should always plant the largest seeds and roots, because the nourishment they contain is intended for the sprouts—hence the practice of cutting off all except the "eye" of an Irish potato is very injudicious. It delays the maturity of the new plant, so that when it ought to be supplying its tubers with food it is doing its best to get grown; the seventh is that the best time to cut down trees for building material is just after they have born a full crop of mast, because their bodies are then free from those nutritious fluids which in lifeless trees are ever ready to undergo decomposition.

These are some of the legitimate deductions from the theory which I have advanced, and it is gratifying to know that experience has proved most of them to be true.

There are many practical questions in husbandry whose solution, I think, is now within our grasp—those, e. g., of saving wheat before it is fully ripe, cutting off the vines of sweet potatoes, &c.; indeed, it may be fairly claimed that, on reflection, we shall find ourselves armed for successful advances in many departments of useful inquiry.

In conclusion and further illustration of this subject, I have the pleasure of relating some very interesting facts, which came under the observation of one of the most scientfic fruit growers in Eastern Carolina, Dr. Henry A. Bizzel, of Clinton. He set out some apple trees several years ago on a parcel of ground which included his garden. It was poor land, except the garden which he kept highly manured. In a few years all the trees outside the garden began to bear fruit; but notwithstanding all the contrivances which skill or experience could suggest to force those in the garden to bear, they would do nothing but grow. He began to despair; but after a while, when they had reached their full growth and were much larger and finer trees than the others, they began to bear, and to his astonishment and gratification, they produced a heavy crop of excellent apples every year.

The most serious difficulty in the progress of agricultural science has been that almost invariably the man who observed the facts and phenomena was not the one to classify and reduce them, or even to pay any attention to them at all. Instead of taking hold ourselves and watching the growth of our crops with parental solicitude, and making the numberless improvements which experience could not fail to suggest, we have entrusted our farms to ignorant laborers, and spent our unprofitable lives amid the corruption and disappointment of political agitation.

With a world of pure pleasure within easy reach, surrounded by the purifying and elevating influence of farm life, having access to the beautiful lessons which nature stands ever ready to teach us, we are to-day scarcely any wiser than our grandfathers were.

When the first steam engine was put in operation, a boy was employed to open and shut the valves in the cylinder. He had not been long at his post before he observed that one arm of the beam moved up and down simultaneously with the opening and shutting of the valves. Taking advantage of this circumstance, he took a pole of the proper length and fastened one end to the beam and the other to the valves, and thus relieved himself of his task. So it is in all the occupations of man: *improvements must be made by those who do the work.*

In farming, it is true, effects cannot always be readily referred to their causes, and there is some difficulty in applying the principles of science to our actual needs; but with the accumulating experiences of intelligent observers, and such Societies as this to digest and classify them, there can be no doubt of a steady and gratifying progress.

CHIEF JUSTICE CHASE ON THE SITUATION—VIEWS OF IMPEACHMENT AND POLITICS.

The following confidential letter from Chief Justice Chase to a personal friend has been published in the New York *Herald* as giving the present position and sentiments of Mr. C. on important political questions:

WASHINGTON, May 25, 1868.

MY DEAR SIR:—You are right in believing that I "shall never abandon the great principles, for the success of which I have given my entire life." I adhere to my "old creed of equal rights," without one jot or tittle of abatement. I shall be glad if the new professors of that creed adhere to it as faithfully.

I am amazed by the torrent of invectives by which I am drenched. Almost everything alleged as fact is falsehood out of the whole cloth. Where an allegation has a little fact in it, the fact is so perverted and travestied that it becomes falsehood. I know no motive all for this except disappointment that impeachment has not thus far proved a success, coupled with a belief that I have done something to prevent its being a success. I have not been a partisan of impeachment certainly; but I have not been a partisan on the other side.

As presiding officer over the trial, my conscience testifies that I have been strictly impartial; and I am sure that any one who reads the report will say so. Individually I have my convictions and opinions, but I have very seldom given utterance to them. Indeed, I do not think that the case, in any of its aspects, has been the subject of conversation between myself and more than four or five Senators, and then only casually and briefly. No senator will say that I have sought to influence him.

The real ground of denunciation is that I have not been a partisan of conviction; and this denunciation I am willing to bear. They may denounce and abuse me and read me out of the party if they choose. I follow my old lights, not the new.

What the developments of the future may be I know not. I neither expect nor desire to be a candidate for office again. It would, however, gratify me exceedingly if the Democratic party would take ground which would assure the party against all attempts to subvert the principle of universal suffrage established in eight, and to be established in all of the Southern constitutions. Then, I think, the future of the great cause—for which I have labored so long—would be secure, and I should not regret my absence from political labors.

SALMON P. CHASE.

MR. PENDLETON AND SUFFRAGE.

A correspondent of the New York *Herald*, who has recently had an interview with Mr. Pendleton, states that "he holds to the ancient Democratic faith on the question of suffrage in the reconstructed States. It is one which is constitutionally left to the States, and each State should have the right to determine it for itself. He is opposed to the enfranchisement of the negro in the South by Congress, and thinks that if the black man is committed to the care of his white fellow-citizens in that region, he will be subjected to no more injustice than is the woman of the North, who is not allowed to vote, but is still secured in all her rights. His parallel is quite an ingenious, if not an original, illustration of his views on this important issue."

☞ The Radicals, although they claim to have all the religion, and the morality, are led by men who seem to delight in deriding sacred things, and revel in blasphemy and profanity. Wade is a notorious vanuser of the Maker's name. Thad Stevens, in Congress, called our Saviour a "single individual," and Carl Schurz, the temporary Chairman of the Chicago Convention, and a leader in the Radical Israel, is the Red Republican infidel who, in a public speech made a few years since in St. Louis, spoke of the Almighty as "the ideal gentleman beyond the skies, called by some people God!" All this may be "highly moral" from a Radical point of view; but it is frightful, nevertheless, to put power into the hands of such profane and godless agitators.

☞ The term "scallawag" is one that is derived from the cattle market. It is there applied to all of the mean, lean, mangy, hide-bound, skinny, worthless cattle in every particular drove. It appeared to be so exactly suited to the men who happened to have been born white, in the South, and who had affiliated themselves with negroes and carpet baggers to degrade their States, that it was first used in this paper in a new year's article on the first of January last. Since that time it has been taken up by the press all over the country and has become as familiar in connection with a certain class of politicians as it was before to butchers and cattle dealers.—*Richmond Examiner.*

BUTLER ON GRANT.

This satirical witticism is attributed to Butler: When Donnelly said Washburne carried Grant in his breeches pocket, Butler remarked, "it was the proper place for small change."