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The ROCKY MOUNTAIN HUSBANDMAN is designed to be, as the name indicates, a husbandman in every sense of the term, embracing in its columns every department of Agriculture, Stock-raising, Horticulture, Social and Domestic Economy.

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AGRICULTURAL.

AGRICULTURAL EDUCATION.

At the recent meeting of the National Agricultural Congress at Cincinnati, one of the most interesting addresses was on agricultural education, by J. M. Gregory, LL. D., Regent of the Illinois Industrial University. We give the first part of the address:

The question of agricultural education is yet in an unstable condition. In spite of all the experiments made, and all the successes and failures achieved, the public mind is yet unsatisfied as to both the feasibility and the value of special agricultural education in agricultural colleges. Among professional educators even, there are differences of opinion, some distrusting and even denouncing agricultural colleges as an expensive humbug, a piece of educational charlatanry, while others defend and praise them as just in conception, needful in fact, in keeping with the spirit of the age, necessitated by the progress of science and arts, a measure of justice to the largest class of the people, and the most important branch of human industries, and as having attained a reasonable, if not a large measure of success in the presence of great disadvantages and opposition.

Is agricultural education a mistake? Was that great and wide-spread agitation of thought which pervaded both Europe and America in favor of a new form of education for agriculture, and the other industries, without any just cause? And was the urgent and irresistible demand for colleges of agriculture, which assailed our National Congress, and compelled the effort for the establishment of these colleges, a blunder? Who dare say yes to these questions? Philanthropy, patriotism, and science all combined in the plea for agriculture. Philanthropy pleads for that mightiest section of the grand army of workers, the tillers of the soil. More than one-half of the entire industrial population of the country belong to this section. If education is a boon; if its aids can lighten toil and enrich its products, then that broad democratic maxim of "the greatest good to the greatest number," demands that agriculture shall have its colleges among the noblest and richest of all in their appointments and power.

Patriotism pleads for it as increasing public wealth, carrying higher intelligence into the very bone and sinew of the country, and making broader and firmer the great foundations of the government.

Science demands access to the classes who have most of all to do with the great facts and gigantic forces of nature. It asks the co-operation of these classes to increase its stores of facts; to extend its observations, and to test its theories; and it proffers to them in return its richest results to promote their work.

But the demand for agricultural education is not a mistake. It was based on the well considered fact that agriculture itself involved forces and operations which can only be understood through scientific study, and can

only be improved and perfected by the careful application of scientific principles. The agriculture of the world needed a new study, and a more perfect mastery of its principles, and a more intelligent husbandry was demanded by the multiplying wants of the civilized world.

The conclusion was neither untimely nor unreasonable that educational forces and institutions might be called in to aid in this needful work. Schools had already done much for the so-called, and often miscalled, learned professions. They had improved both the theories and practice of law, medicine and theology. In engineering, architecture, mining, and other useful and fine arts, education has been successfully invoked, and had been found so useful and powerful an aid to national progress as to awaken the attention and command the support of enlightened and rival governments. It was neither unwise nor unreasonable to suppose that this broadest and, at bottom, most scientific of the industrial arts might successfully seek aid from schools of learning organized in its interest.

It is not strange that amid so much agitation, and such ardent advocacy, many exaggerated expectations should have been formed—expectations sometimes unreasonable even to absurdity, often contradictory, and almost always impatient of time and urgent for immediate fruitage. Nor is it strange that these expectations have been so frequently disappointed, and that, being disappointed, they have led many to the conclusion that agricultural colleges have proved a failure. They have simply failed to meet some of these extravagant and unwise expectations. Tried by a fair test they have, in many cases, attained a remarkable success.

Allow me to mention some of these expectations:

1. The farming population, groaning under burdens and disabilities, and looking in all directions for the causes and for the relief, easily saw that the superior education and intelligence of those whom they regard as their oppressors gave them an undue advantage, and rightly enough concluded that agricultural colleges would increase the intelligence of farmers, and give to them educated and powerful leaders, just as the law schools had made lawyers learned. And this expectation will be met, but not as soon as was hoped. Education diffuses itself slowly.

2. Others were vexed to see all the college-bred sons of farmers (and the farmer's boys have gone to college as often as those of any other class,) refusing to return to their farms, but making their way to the cities and entering professional life or trade, and they wished for colleges for farmers' children which should make them learned and leave them farmers. It was not agricultural colleges, but colleges for agriculturists, which they wanted. Not colleges devoted to agricultural science, but schools for agricultural children.

The excellent president of a State agricultural society told me he did not ask the agricultural colleges to teach agriculture, but he wanted a place to send his boys where he could get them educated without being spoiled for the farm. The evil, if evil it be, he complained of, is deeper and nearer home than he thought. Farmers' sons go to the law and other professions full frequently with their ambitious fathers' or mothers' advice. "John is too smart to remain a mere farmer; let us send him to college and make a lawyer and a gentleman of him," say they.

3. Others had observed the ignorant and unbusinesslike way in which too many farmers manage their farms and affairs—the heedless and ruinous waste of the fertility of the soil—and thought of the agricultural colleges as a remedy.

4. Others still had a higher conception of the character and extent of agricultural science, and were anxious to have experiments made, investigations prosecuted, and the great secrets of the soil and seeds, of

animal and vegetable life and growth brought to light and proclaimed throughout the earth. And the agricultural college ought certainly to lead in this work, and will if you will make them also agricultural experiment station.

As men differed in regard to what the agricultural college was to do, so they differed in respect to what it ought to be. Some would have made it a mere school of practice. Others would have resembled it to the law school and medical school, making it merely professional and purely theoretical. Others wished to see a college for farmers' sons where they might continue to labor while they studied. And others still wished a college where the sciences relating to agriculture and the mechanical arts might be taught thoroughly, with their practical application to agriculture, etc., clearly exhibited and enforced.

I need not further enumerate the different notions which prevailed and have been urged upon the boards of trust of these colleges, and through the press upon the country at large. Their number is legion, and their aims so various, that the combined wisdom of the world could not reconcile or satisfy them all. They are only mentioned now, because of the difficulties they have interposed in the path of agricultural education on this continent. Every disappointed hope, and every defeated plan has become an obstacle in the way of success by alienating friends and discouraging supporters of agricultural colleges. Most men will much more readily conclude that the management has been bad, than that their expectations were unreasonable, and the failure to carry out their particular plans is a failure to do anything wise or worthy of praise.

But there remain a valiant and far-seeing few (may their numbers increase) who clearly discern that the fundamental ideas of agricultural education are as sound as their aim is far-reaching and beneficent, and whose faith is as firm as the solid scientific truths on which it rests. And while others are searching for supposed causes of hypothetical failures, these are seeking to understand and measure, and if possible, to remove the obstacles to a more complete and wide-spread success.

DEEP AND SHALLOW CULTIVATION FOR WHEAT.

I hope we are all agreed that very deep disturbance of the soil, so that it may derive the advantage of communication with the air, is, after drainage, an essential agricultural basis. But there is a very general belief that for wheat the surface, at all events, should be solid, and the plowing shallow. I remember that the late Rev. Samuel Smith, of Lois Weedon, could only get Rivett (bearded) wheat to stand erect on deeply cultivated soil. My practice has been to subsoil very deeply, and manure heavily for mangel, kohlrabi, cabbage, and turnips but to take wheat or barley after these on a single plowing with a pair of horses. The effect of deep cultivation immediately before wheat sowing, causes the plant to be very vigorous and foliaceous, and pleasant and profitable in appearance, but at harvest, especially in such a season as this, we find the straw "plus" and the grain "minus." We are apt to condemn a non-leafy and rather open looking wheat crop, but it often comes well out of the threshing machine, and it is a common saying that the wheat after mangel rises well in proportion to the straw.

In 1863 my nine acres of wheat followed three different crops:—tares mowed, and the land manured with shed manure, one and a half acres of cabbage, the rest peas, half picked green for London, the other half seeded. Well, the wheat after tares was a rich, thick growth of leaf and straw, and every visitor, as well as ourselves, pronounced it to be 7 qr. per acre. The piece after cabbage looked thin and comparatively unyielding, and being on a hillside was visi-

ble as a sore place, and condemned by all as a comparatively weak crop. The piece after picked peas was much stronger and more leafy, that after seeded peas better than the cabbage piece, but weaker than the rest. We were all mistaken; the condemned cabbage piece was not only best in quality, but also in quantity. And another important result ensued. The field was sown down with clover in the wheat. On the tare land it was a patchy crop, on the cabbage land a thick and abundant crop; a moderate crop after the two pea pieces. At three hundred yards distance all these pieces were distinguishable as though painted on a map. The cabbage land plowed up hard and stiff, and difficult to drill; the rest more or less mellow.

This year our barley and wheat, after kohlrabi was drawn off, tops and all, looked thin and weak, but are now yielding better in quantity and quality than the more rich looking crop adjoining—after beans and mangel; the mangel tops being left on the ground. How clearly all this is explained by that greatest of agricultural philosophers, Liebig, in his *Modern Agriculture*, page 176:

"The previous cultivation of some underground crop or some plants with extensive root ramification, will tend to make the soil more favorable for the subsequent growth of a cereal." Page 123: "But in proportion as the conditions for the formation of straw and leaves became more favorable, so did the quality of the seed deteriorate as its quantity diminished. . . . We may imagine that where there exists in a field this inequality in the conditions for the formation of grain and straw, a culmiferous plant may under conditions of temperature and weather favorable for the production of leaves, yield an enormous crop of straw with empty ears. . . . In tropical regions, many culmiferous plants bear no seed, or but a small quantity, because the soil does not contain the proper proportion of conditions for the formation of seed and leaf."

Seasons have much to do with success of particular crops. The unseasonable heavy rains and east winds of July ruined the crops on highly farmed lands, while it greatly helped the poverty stricken and thin crops on poorly farmed lands, which a dry and seasonable July would have yielded poor returns. I Crosskilled all my wheats in the spring with the addition of 5 cwt. to the Crosskill, 4 horses to draw it; but even so, the steam cultivated land forced a very abundant standing crop on sixty-two acres of wheat, which looked perfection on July 7th, but ultimately succumbed to the unsuitable downpour and blight of July. It was noticeable that the portions of field horse plowed, not being so luxuriant, stood better and yielded best in quantity and quality, as did those after exhausting previous crops.

There can be no doubt as to the fertile appearance of cereal crops on fallowed or deeply cultivated and highly manured soils; but under certain circumstances, the results do not correspond.

I remember that Mr. Woodward, of Pershore, a successful agriculturist, always trod his wheat. I have seen the men doing it, and where he broke up an old, worthless pasture, twenty-four horses were employed in tramping it to solidity, and he then grew large wheat crops. My plau hitherto has been to skim or scarily the surface, burn the weeds or stubble, and then plow with a pair of horses for wheat or barley. Where I have steam plowed deeply this year for Rivett wheat, and for barley, I have left half an acre to be horse plowed to test the difference.

Everybody must believe who sees the action of the powerful and undeviating steam plow, that its cultivation is more perfect than either horse or manual labor. It lies as light almost as a feather bed—no treading—and so well fitted to receive atmospheric influences and fructifying alliances—J. J. McCh.