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A word in behalf of experiment stations



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A WORD

IN BEHALF OF

EXPERIMENT STATIONS

AT OUR

AGRICULTURAL COLLEGES.

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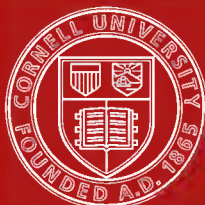
REMARKS MADE BEFORE THE  
COMMITTEE ON AGRICULTURE OF THE HOUSE OF REPRESENTATIVES  
AT WASHINGTON, JAN. 28TH, 1886,

BY

CHARLES KENDALL ADAMS, LL.D.,  
PRESIDENT OF CORNELL UNIVERSITY.

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ITHACA, N. Y.,  
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## REMARKS

*OF PRESIDENT ADAMS BEFORE THE COMMITTEE ON AGRICULTURE OF THE HOUSE OF REPRESENTATIVES, AT WASHINGTON, IN RELATION TO THE BILL FOR THE ESTABLISHMENT OF EXPERIMENT STATIONS.*

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MR. CHAIRMAN AND GENTLEMEN :

As I listened to Mr. Willetts I could not but hope that he would occupy not only the time allotted to him, but also the time allotted to me. He has, however, not gratified that hope, and therefore I shall venture to say a few words, simply on one or two points he has not touched upon.

Before entering upon any discussion of those particular questions, however, with which I intend to deal, I wish to make one or two preliminary observations.

I suppose that everybody has observed, and we shall all have to admit, that there is in the country more or less of dissatisfaction with the way in which the agricultural colleges have met the expectation that was formed concerning them when the Morrill grant of 1862 was made. While I do not think this dissatisfaction is generally well grounded, I am inclined to believe that there are certain inherent difficulties in the way of the schools of agriculture that have not thus far been fully and frankly met. Two difficulties, more or less serious, have seemed to stand in the way of success, even with those institutions that are planted upon a firm financial basis.

In the first place, it is found that the farmer boys are not able, as a rule, to spend a sufficient time at college to enable them to gain a complete agricultural education. They are very generally occupied on the farm in such a way that their absence is found to be a very serious inconvenience ; and therefore either the course

of instruction must be very elementary, or the college must do without the support of any very great number of students.

Then a second difficulty presents itself. If a farmer's boy takes a course of somewhat prolonged instruction, he is more or less apt to acquire a taste for other pursuits, and so allows himself to be drawn off into other vocations. The consequence of these two sources of difficulty has been to create a very considerable doubt in the public mind whether the agricultural colleges were meeting the want that was intended to be supplied when the grant was made.

Now it is worthy of note that the nature of these difficulties does not depend at all upon the quality of instruction given in the colleges. The fault, therefore, I think, cannot fairly be said to be with the colleges themselves. The same embarrassments have been felt elsewhere in the world, though probably to a more limited extent. In Germany, in France, indeed everywhere on the continent of Europe, scientific farming is a more absolute necessity than it is felt to be in this country; and therefore something like scientific training is regarded as quite indispensable. But even in those countries, until other means than those of instruction to students were devised for bringing the results of scientific instruction to the knowledge of farmers, the agricultural colleges failed to accomplish the good that has since been the result of their efforts. It was found that if the farmers, and the sons of farmers, could not spend time to go to the agricultural colleges, then the agricultural colleges must devise some means of going to the farmers. When they discovered that the mountain would not come to Mohammed, they contrived a means by which Mohammed could go to the mountain. This was the object of the experiment stations in Germany and in other parts of Europe. It was known that at every efficient agricultural college experiments were carried on, a knowledge of which would be of vast benefit to the farming community, if the results of those experiments could be published and placed before the farmers at their own homes. In this way it was that, in Germany especially, and in a less measure in all the other countries of Europe, the difficulties we have experienced

were met with and overcome. In providing, therefore, the means for establishing experiment stations and publishing the reports of experiments made, Congress will simply be doing what the experience of the world teaches to be an absolute necessity, if we would reap the full benefit to be received from our agricultural colleges.

Now, after this preliminary statement, I shall endeavor to answer one or two questions that will inevitably be asked. "What can you do for the farmers with this grant?" is a question that will be very generally asked, and it is well that it should be answered. I cannot do better in the way of reply than to give two or three illustrations; and I do so by selecting from the last report of the experiment station at Cornell University. I take the first two experiments because, in the first place, as I think you will see, they teach a practical lesson to every farmer; and, in the second place, because they are experiments that could not possibly be conducted at a station not supplied with a very considerable outfit in advance.

When Cornell University was established, there was given to it, as the home of the agricultural department, a farm of about 250 acres—a farm which, like many others in the older portions of our country, was very much worn and had become very sterile. For some years strenuous efforts were made, by the purchase of artificial fertilizers and the hauling of manures from the village, to improve its condition. The results were not very satisfactory. At length the Professor of Agriculture determined to conduct a series of careful experiments with the view of ascertaining whether the products of barnyards could not be made much more efficient in the enriching of the farm than ordinarily they had been. It is well known that when manures are exposed to the rain the soluble parts are very largely washed out. When it is thrown into heaps and neglected it becomes fire-fanged, and the ammonia and other volatile parts are thrown off into the air and lost. The Professor of Agriculture determined to enclose a yard and cover it to receive all of the manure made by some forty-five head of stock. The cattle were allowed to tramp it down; and provision was made, by spreading it over the yard, to prevent its deterioration from

heating. In the Spring experiments were made for the purpose of ascertaining the results. It was found that the total amount accumulated was 466 tons, and that by analysis the nitrogen, phosphoric acid, and potash, estimated at the ordinary commercial values of these materials as represented in the commercial fertilizers offered for sale, amounted to no less than \$1,682.00. That is to say, it would have cost \$1,682.00 to have purchased the same quantity of nitrogen, phosphoric acid, and potash of about the same degree of assimilability in commercial fertilizers. The experiment was continued the next year with similar results. It cannot, of course, be claimed that the crops of the farm were at once increased to so large an extent as to yield a return equal to the estimated values of these manures; but, nevertheless, it is definitely shown that the lands upon which manures so made have been applied have steadily increased in fertility until the crops now produced are more than twice as great as the crops produced upon adjacent lands treated with manures made in the old style.

It deserves, perhaps, to be said that this experiment is one that teaches its lesson to every farmer in the land. It would be easy to show by the simplest mathematical computation that it would not be a difficult task for the farmers of every county in the State of New York to increase the annual value of their products by far more than the whole amount of the annual appropriation which this bill proposes to give to each State.

Take the second experiment of this same report. An effort was made scientifically to determine the quantity and value of manures made by milch cows. The food consumed by three cows was carefully measured, and an estimate at its market value was put upon it. It was found that food for three days, consisting of clover hay, cornstalks, cotton seed meal, corn meal, and malt sprouts, amounted in cost, to \$2.09. It was found by analysis, furthermore, that the manure produced by these animals during the same period had a value of \$1.51; that is to say, the amount of nitrogen, phosphoric acid, potash, and other fertilizing ingredients contained in this manure would have cost \$1.51, if purchased in the form of the cheapest commercial fertilizer of the



market. While the food cost \$2.09, the manure was worth \$1.51 at the market price.

Here, too, is an indication of a practical result, that could be made use of by every farmer in our land. It was completely demonstrated that much more than one-half of the cost of food can easily be got back in the manure, if the manure is properly treated.

Now I will not weary you to give details of further experiments. There were, however, reported in the same pamphlet experiments on "The result of feeding ensilage to young cattle"; "The effect of sudden changes in the ration on the composition of ~~meat~~"; "A comparison of the productive effect of the same ration with different breeds of cows"; "The gain of steers on a fattening ration," and a large number of reports upon field experiments, crops, and on the cost of plant food in commercial fertilizers in the State of New York. These titles are perhaps enough to give an idea of the nature of the work done at the experiment station connected with Cornell University.

*meat*

Now, you may very well ask why all these experiments cannot be made, and the results published without any further appropriation from Congress. The answer is this: The primary idea of the agricultural grant of 1862 was, as Mr. Willetts has said, not the making of experiments, but the giving of instruction; and I suppose that I should be safe in affirming that there is not an agricultural college in the land that does not exhaust all its resources in simply furnishing the means for giving that instruction which was thus contemplated. Cornell University is not exceptionally poor, but it has never been able to furnish the needed equipment of an experiment station, much less the means for the publication of the results of such experiments as were carried on. Three reports have been made, but these, I am almost ashamed to say, have been published for the most part, at private expense, by sums voluntarily contributed out of the pockets of Trustees and Professors. It has been, therefore, and without further appropriation it will continue to be, absolutely impossible to make such experiments and publish such results as the farmers of the State really need.

But, it may be asked, cannot we rely upon the States to make the necessary appropriations? The answer must be in the negative. Only a few of the States have made any provision for experiment stations. There are perhaps eight or ten stations established by State Legislatures; two of these, if I mistake not, having an existence independent from agricultural colleges. But such support is necessarily precarious and cannot be relied upon for doing all the work that is really needed. Much of the work can well be done by such independent stations; and, therefore, their work is by all means to be encouraged. But as the small college, however excellent the quality of its instruction, cannot do all the work of the great university, so the independent station cannot do the work of the fully equipped agricultural college. There is ample room for both.

There is another phase of the matter to which I beg very briefly to call your attention; and that is the ease with which the work of experiments can be carried on where an agricultural plant of considerable importance is already in existence. I refer again to Cornell University, the one with which I am especially acquainted. The University has two large barns, one of which would probably be given up to the exclusive use of such a station. It has laboratories among the most complete in the country for the prosecution of work in organic and agricultural chemistry. It has fully equipped mechanical shops where a large number of young men are in constant process of training, either as mechanical engineers, or in some one of the branches of the mechanic arts. On the farm of the University there are some forty-five head of cattle, either thoroughbreds or grade stock, besides from fifteen to twenty horses and a considerable number of sheep and swine. The Veterinary Department makes it easy to observe the pathological conditions of animals in health and disease. The botanical equipment of the University is among the best in the country. The Department of Entomology furnishes facilities for the most careful observation of the habits of all kinds of noxious insects. These several departments are in charge of professors who have been selected with great care on account of their attainments;—and all

of these resources can be made directly available, if this appropriation is made.

Then, too, a very great advantage is to be experienced in the possession of a thoroughly equipped library. In its number and variety of agricultural works, perhaps, the library of Cornell University is unexcelled in this country. The importance of such a collection of books is in the fact that vast numbers of the experiments here carried on have been carried on in other countries, and it will be easy to compare and verify results. In twenty-five years after the first experiment station was established in Germany the number of their published reports amounted to some twenty thousand. The mere list of them covers a hundred and forty-five pages.

It ought perhaps to be said that experiments are constantly going on with us—and, I suppose, at all the other agricultural colleges in the country—which would be of great value to the farmers of the country if these results could be properly collated and published in a shape for general use. For example: Professor Law has privately established a clinical laboratory for the purpose of treating domestic animals. Professor Roberts is constantly carrying on experiments in the use of manures on the farm, and in the use of different kinds of food with the stock at the barns. Professor Caldwell, in a similar manner, is carrying on experiments in the chemistry of soils and of their products. The same may be said of the general nature of the work of Professor Comstock, the Professor of Entomology; and of Professor Prentiss in the Department of Botany. It is only necessary that these results should be supplemented and organized and co-ordinated and published, in order to be to the agricultural interests of the country, and consequently to all the country, of value vastly beyond the amount of the appropriation here contemplated.

I have already spoken at greater length than I intended; I will therefore give way to those who are to follow.







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