AGRICULTURAL EDUCATION.

ADDRESS OF PRESIDENT ABBOT OF THE MICHIGAN STATE AGRICULTURAL COLLEGE

Before the House of Representatives of the Michigan Legislature, March 4, 1875.

There is a special need of educational work for farmers. Little comparatively has been done for them. A young man may choose out of hundreds of schools in which to study law or medicine, or the higher mathematics, or Greek and Latin. In these branches teachers and text books abound. Schools of civil engineering, even mechanical engineering and mining abound, if we take account of the comparatively fewness of the classes for which they exist. In agriculture here and there a school or a professorship struggles against deep settled prejudices of community and the inherited axioms of liberal education.

Again, farmers are isolated; there is not that sharp action of mind upon mind which disciplines to quick perception and logical thought the artisans of a manufacturing city. Information, improvements reach them more slowly than other industrial classes. Again, mechanical works, making of railways, mining, manufactures, employ the masses of laborers under a skilled master, whose education in a sense suffices for all, while in agriculture the advance depends upon the general progress of the masses themselves.

Besides, the business of a farmer is highly complicated as compared with that of a carpenter, a miller or a manufacturer. An apprenticeship that would fit a young man to compete with co-laborers in most trades would go but little way in fitting him to be a good farmer. Machinery is made according to fixed principles of action, that are simple and to a great extent known. Mechanics are so exact as to go by the name of applied mathematics. It is not so with the farmer's business. Quite a body of empirical rules exist; but underlying principles that would enable one to vary his practice from a knowledge of the relations of cause and effect are to a great extent wanting. Until these principles are ascertained, agriculture will be among the arts that have no fixed foundations in science. "To know well," says Lord Bacon, "is to understand causes." Liebig says, "There is no profession which for its successful practice requires a larger extent of knowledge than agriculture, and none in which the actual ignorance is greater." Of all the pursuits of man, says Carey in his "Social Sciences," vol. 2, d. 26, "agriculture is the one requiring the highest degree of knowledge." The processes of nature in the production of plants and animals are hidden; plans cannot be made, giving in their execution exact predicted results, as a machinist can do. The routine found good in one place requires modification with the variations of many circumstances in another. It would certainly seem, therefore, that in no business would knowledge and mental discipline be of more service.

When the farmer understands the breeding and care of his cattle and the raising of his crops, there is other knowledge needful still. His business has wide relations to the affairs of other men. These he needs to understand. He should be acquainted with the laws of transportation, of trade, and of money. Ex-Gov. Seymour, of New York, in a late visit to the Agricultural College, told me that the Cheese Association of his place find it to their profit to have bulletins regarding the markets direct from London. In respect to this needed knowledge of political economy, farmers, as a class, are lacking. They are too apt to rest content with what they are told when they come to market, and too apt to plan with reference to the last year's profits only—to rest content in intellectual isolation.

Farmers, as a class, do not take the social and political rank that their numbers and importance entitle them to. There are about 6,000,000 persons engaged in agriculture in the United States. The census give 41,106 lawyers, and yet Mr. Perry, the able professor of political economy of Williams' College, is reported in the papers to have said publicly that he could point out one hundred of those lawyers who have exerted more political influence in the State and nation than all the 6,000,000 farmers have done.

Consideration cannot be forced; it must be the outcome of genuine respect. Legislation can not reach this case of social and political standing; education can.

There is another drawback to the farmers' business which education only can reach. The sons of farmers who acquire an education forsake the calling. The other occupations of life present more alluring prizes, great wealth, honor and influence.

Were it not that education has generally meant abandonment of the farm, that an education which does not lead to other business is generally regarded, and by farmers themselves also, as wasted; were it not that farming is often devoid of what gives it pleasantness and dignity, we might hope that many would seek an education in order the better to be farmers.

Prof. Andrew F. Peabody, of Harvard University, says with truth: "To restore the deranged balance to society, its old honor must be rendered back to labor. Industrial pursuits must be raised in respectability and dignity above the lower walks of commerce, and fully to a level with its higher departments and functions. Both agriculture and handicraft must be made liberal professions. This can be effected only by stocking them with men of liberal culture, for it is not the profession that gives character and standing to the man, but the man to the profession. Our agricultural colleges and our industrial institutes," he goes on to say, "are supplying the needed culture, and are going to replenish the field and the workshop with a new order of large and high-minded operative men of liberal tastes, pursuits and aims, who will do honor to their respective callings, and make them seem worthy the noblest ambition of the aspiring youth to the coming generation."

Who, looking over this fair peninsula, noting how largely farmers exceed any other class in numbers, and that agriculture is the mother of arts, can bear to believe that its ranks of farmers must continue to be depleted of the educated ones of their sons, that a social and political distance between farmers and those in professions shall grow up and widen, that the greater discipline and knowledge is to be usurped by the capitalists, and that agriculture is to remain longer stationary while all other trades are moving on.

NEWSPAPERS AND CLUBS.

No means of education can compare with the newspapers and periodicals. In the *Western Farmer* for December 17, 1871, it is stated that there were but six agricultural papers in the United States in 1833. Now about one hundred agricultural papers, or an increase more than thirty times as great as that of our population, and well edited columns in other papers, spread amongst hundreds of thousands of readers their weekly, or monthly records of agricultural progress and experiments. So there were in 1833, but four agricultural societies in the United States. In June, 1872, 1980 such societies and clubs, reported to the Department of Agriculture in Washington, and Michigan alone sent in the names of 58; and one has only to read the annual programme of such a club as the Volinia, ask after the discussions and experiments of one like the Romeo, or secure a list of the lectures and papers presented to one like the Mason club, to be aware of their great educating influence. The grangers also, by discussing in their meetings a still wider range of topics, embracing not only practical farming but the relation of the business to the other industries of the world, cannot but prompt its members and the communities they are in to set a high value on education. My purpose, however, does not lead me to dwell on these means of agricultural education, great although they be. The history of education shows us that the college is also needed. The scientific schools of the world, although the students in them form but a small proportion of the army of laborers in the business they teach, mining, engineering, designing, manufactures, still have had immense influence in furthering the arts. They are the headquarters of that scientific grounding and systematic presentation of principles and practice that must be found somewhere in every art and profession. Into this field agricultural colleges are but lately entered, in this country at least, and I turn your attention to our own.

Whatever departments may hereafter find a place here, the college has endeavored to be truly and emphatically agricultural. With its limited means, any additional school would have been poorly provided for. Besides, as a school of agriculture, it is yet far from perfect. A widespread distrust of it as a probable center of book-farming, a disbelief among a wide class of the better educated in all attempts to return a man from a college to a farm, the annual appeal for assistance from the State, all together, have compelled to a system of bestowing on the college an amount in sufficient to carry on any technological school of high merit. The intention of successive legislatures, that of 1873 excepted, has been to help it simply to live until its funds should support it. Estimates for the purchase of stock, or implements, or books, or for a professorship of chemical physics, or mathematics, or of mechanics and surveying and rural engineering, or of political economy and history, or of geology, or veterinary, are reduced to a minimum or generally stricken out altogether before applying for aid.

I do not complain of this, I only state it. But it is hardly worth while to enter on new fields before the one we cultivate has put on the comeliness of vigor and healthy growth. In every vote in the House in previous years, more farmers have voted for the college than against it, and the college hopes through the efforts of farmers and all interested in education, to become just what is needed as a professional school of agriculture, and then to have their hearty confidence and support.

The growth has doubtless been slow. Professors of agricultural chemistry and horticulture had to be made, or rather in the face of adverse criticism, with every failure through inexperience open to the world, to make themselves. Text books were not. The schools were filled with teachers who, coming from other institutions, turned their pupils's ambition to the halls they had left. The course, devoid of classics, crowded with science, compelling to manual labor, and long, was repulsive to many. And I have known students coming to college in the spring, hearing of doubts as to whether appropriations would be made, to determine that they could not afford the considerable expenses of starting on in such uncertainties, pack their goods and return to their homes.

COURSE OF STUDY.

The course of instruction at our Agricultural College should be such as to made good farmers, at least put the students and graduates in the way of becoming such. Let us turn our attention first to the indoor course of instruction. I believe the law is right in its requirements for admission. This is as follows; "No student shall be admitted to this institution who is not fifteen years of age, and who does not pass a satisfactory examination in arithmetic, geography, grammar, reading, spelling and penmanship. These branches are not taught at the college.

The common schools of the State can carry forward the education of young men so far. To put the standard of admission higher would be to exclude many from the halls of the college who have no means of carrying their preparatory education any higher. As a matter of fact, the average age at admission was (1874) eighteen and a half years, and a larger part of the freshmen had some knowledge of algebra and other branches. The requirements for admission might be increased with the increased efficiency of our common schools.

Shall the course of study be purely professional? Such courses seldom exist in any school. Take a medical course of study, and its chemistry belongs to manufactures as well as medicine; its anatomy and physiology are no part of medicine. Huxley studies them not to practice, but to classify the animal kingdom, and Spencer and Bain make physiology the introduction to mental science. Technological schools usually teach sciences as well as their applications, and the modern languages.

But it may be thought that while chemistry, botany and the like lie closely enough to the proper fields of an agricultural education, literature, political economy and the like are too remote from its objects to have a place in such an institution as ours. Let me quote to you the eloquent words of Mr. Williams, the first president of this institution: "A farmer is a citizen, obliged to bear his portion of public burdens, amenable to the laws, and in an humbler or a wider range, may become an exponent of society. He should be able to execute, therefore, the duties of even highly responsible stations, with self-reliance and intelligence. The constitution of the Union, and of his State, he should comprehend, and the laws and forms relative to township and county officers and their duties. He should be qualified to keep farm accounts, draught ordinary instruments, survey his farm, and level for drains and highways. His native language should be a flexible instrument at his command, which he should speak and write with ease and vigor, that he may instruct and impress others, avert mischief, or inculcate truth. A man moved by earnest reflection or deep emotion, should have capacity to give them utterance and force in his mother tongue."

If these studies then are highly desirable, if the awakening of a taste for history and other reading, the elements of political economy, correctness and facility of speech are requisite to the education, why should they not be taught at the Agricultural College, if they are given their proper place as subordinate to the special studies that are peculiarly appropriate to the course? They cannot be taught much more cheaply anywhere else, for our classes could be joined to no classes in other colleges without an increase of instructors.

Unless these studies are taught at the college, its students will not have them at all. It is useless to talk of their going to other schools to learn these things. Young men, unwiesly, as I believe, take the shortest road to entrance on their life-business. You have only to open catalogues of law and medical schools to see how few are marked as having completed any course of study preparatory to their professional course. Taken altogether it is scarcely more than one in ten. If, then, students will not take a preparatory course for a short curriculum into the learned professions, all whose traditions favor erudition, they are hardly likely to do so for our longer course, in order to reach a business where an education is commonly thought to be thrown away.

This wider range of study is in accordance with general desire and the law. The inaugural address of President Williams, the law organizing the college, the law of re-organization, the various addresses and reports of similar institutions in the country, all agree in recommending this wide range of study.

The law of Congress "donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," provides that the interest of the fund "shall be inviolably appropriated * * to the endowment, support and maintenance of at least one college, where the leading object shall be without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

LAW REGARDING STUDIES.

The law of this State—submitted by a farmer to the Senate in 1861—is still more full. Its provisions are as follows:

"The State Agricultural School * * * shall be known by the name and style of 'The State Agricultural College;' the design of the institution, in fulfillment of the injunction of the constitution, is to afford thorough instruction in agriculture and the natural sciences connected therewith; to effect that object most completely the institution shall combine physical with intellectual education, and shall be a high seminary of learning, in which the graduate of the common school can commence, pursue and finish a course of study, terminating in thorough, theoretic and practical instruction in those sciences and arts which bears directly upon agriculture and kindred industrial pursuits. The course of instruction shall embrace the English language and literature, mathematics, civil engineering, agricultural chemistry, animal and vegetable anatomy and physiology, the veterinary art, entomology, geology and such other natural sciences as may be prescribed, technology, political, rural and household economy, horticulture, moral philosophy, history, bookkeeping, and especially the application of science and the mechanic arts to practical agriculture in the field. * * * A full course of instruction shall embrace not less than four years."

The course of study has been made to meet the requirements of the law so far as its limited means allow. At the same time students are received for instruction in such studies as they shall select, so that virtually there are shorter studies.

SCIENTIFIC STUDIES.

The sciences have a place very properly in professional schools. The student not only desires to know what to do, and how to do it, but also why? The mind prompts to the inquiry after the reasons, so far as they are known, and to speculation where actual knowledge is lacking. Out of this curiosity science arises and is furthered.

The surveyor studies geometry, although he could do ordinary surveying as most persons do, without understanding it; the navigator usually manages his vessel according to rules, but he would often be more competent to his work if he understood astronomy, trigonometry and physical geography.

It has sometimes been doubted whether agriculture is yet well enough understood to make a knowledge of the sciences of chemistry and botany and vegetable physiology of any great value to him. We know how to do many things, do we know why? We understand the value of rotation of crops in general culture. Does chemistry throw any light upon the reason? It must be owned that the causes at work in agricultural operations are mostly, as yet, mysterious in their working, and that agriculture is but barely entitled to the name of a science. To know what to do and how to do we have to look away from the sciences to the practice of those who are successful farmers. We may visit and talk with them upon their lands, we may see their communications to the papers, we may take the treatises in which the rules of the art have been collected and classified, and it is only by these methods that agriculture is to be learned.

Still the sciences have their uses. It is the desire of thoughtful men to investigate the conditions of growth, and to change the condition of agriculture from that of an empirical art into the nobler one of a science, founded on known principles. They can aid in this work who have a knowledge of the sciences out of which agriculture comes.

Agriculture as a routine practice changes. It is not East what it is West. It calls for modifications according to variations of climate, of implements used, of the demands of the markets. One whose knowledge is purely that of routine might be a model to-day, and in the background tomorrow. A knowledge of science will enable the farmer to understand the discussions that are going on. The unscientific reader of papers, however generaly intelligent, cannot understand these discussions if they involve any accurate knowledge of the sciences. But with such knowledge he can keep up with the discoveries science is making, and find out their applications to his business. A young man who has made the technical terms and principles of any science familiar to himself, has received the best of training in the art of observing, comparing, thinking. His present knowledge consisting of general facts in systematic arrangement, becomes the nucleus about which all he sees, or hears, or reads gathers in orderly array. Modificaitons in his practice are more easily adopted by him than by his neighbor who does not think.

But even now, science has taken so fair a hold of agriculture that a knowledge of botany, animal and vegetable physiology, entomology, chemistry, meteorology and mechanics are of essential service to the thoughtful farmer. The relations of fertilizers to vegetable growth are beginning to be known, and chemical analysis to be profitable, and some light has been thrown on fattening processes, the action of soils upon soluble substances, and a variety of other things. Especially are new facts being elicited which admit of classification and useful application, and even now it will be found that scientific knowledge is one of the most valuable aids to the farmer. Science has always vindicated its practical nature. The astronomy that Socrates thought useless, rules the navigation of the world; the "swing-swangs" that were ridiculed in Hooker's time gave us the clock, and what seems more remote from our telegraphs than Galvini watching the contractions of the leg of a frog? Nothing is more practical than science.

For the continuance, therefore, of his education, but just begun at college, and for his best service to society, the student should be well trained in science. But neither student nor teacher should ever forget the agricultural aim in view. The teaching of the sciences should be saturated, as it were, with the agricultural element, with illustrations drawn from the art, and constant applications of principles to the business of the farmer. In brief, then, the college should impart to the young farmer the elements of such instruction as makes a man and a citizen, should ground him in the sciences on which agriculture depends, should indoctrinate him in the best existing rules and practices of his art, should make him alive to its needs, acquainted with the theories, discussions and experiments going on for its advancement, and fire him with enthusiasm to place his business on a par with those in which skill, intelligence and thorough scientific preparation receive on all hands a due appreciation.

APPLIED SCIENCE IN THE INSTRUCTION.

Practical agriculture is taught as an art, based on experience. The question asked is, what method of management will yield the greatest profit without impoverishing the soil? For answer, it goes to the best farmers of the neighborhood, the State, the world, and critically examine, how they do. It takes account, of course, of climate, market, cost of labor. It attempts also to give the scholar a wider than a one year's view. It may show that a root crop that does not pay so large returns one year as another in its place would do, may repay in the end, if labor can be put upon it, in the oxidation of the soil which its frequent stirring has promoted, or by the eradication of weeds. It may ask the student to try the effects of a mixed husbandry for a series of years with a succession of sudden changes, as from sheep to hops.

The instruction is given in a series of daily lessons for one-half year, and another series of three a week for another half year. Lectures are sometimes given in the field and barns. The farm now, for the first time since the students received it a wilderness to be cleared and subdued, furnishes an illustration of well-shaped and partially drained fields under a system of rotation of crops. The summer beauty of the farm, its almost entire freedom from weeds, its respectable crops, have elicited high praise from the farmers who have visited it. The stock which a few years ago was wretched, has become good through a system of a sale of a few inferior for the means of purchasing a better animal.

The operations of horticulture, entomology, embracing bee keeping, the practice of drainage, of surveying, are all elucidated in lectures.

Agricultural chemistry comes in with its course of a half year's daily lectures, and includes dairying and many other things less treated in practical agriculture. From a new point of view it reviews much of the ground that practical agriculture goes over. Vegetable physiology in charge of the professor of botany does the same. We have as it were, three professors of agriculture, each in his separate field of labor.

Lying back of these is the science of chemistry in its purer form—a course of lectures for half a year followed by three hours of daily work for another half year in the chemical laboratory, and by a half year's daily lectures in chemical physics and meterology. By a half year, I mean an hour daily five days in the week for half a college year, which year is the same length of time with us at the university, and at colleges generally.

Similarly, botany, vegetable physiology, anatomy, physiology, entomology, geology, lie back of other instructions. Surely our course of study, pursued as a whole, is sufficiently distinctive, and holds sufficiently close to the governing idea of an agricultural education.

The older institutions certainly show that little is to be hoped from them in the way of educating young men to be farmers. The department of agriculture in colleges and universities has not succeeded in obtaining students. Suppose that an experiment has been tried here which was found to increase the proportion of educated men that go to farming nearly forty fold, would one not think that farmers would look upon it with favor and some pride? This is what the college and a few like it have done; they have made educated men to be good farmers in forty fold greater proportion than any or all other colleges, and yet it hangs in doubt each two years whether a Legislature of farmers will permit it to live or abandon it to die. Established primarily as a school for instruction, as a reading of the laws and discussions will show, it is looked upon with disfavor, because it fails to do as rapidly as some farmers have hoped some other things besides educating young men to be farmers.

Out of a school like this will any graduate return to the farms? Does not manual labor seem ignoble to one whose early youth is given to the acquiring of knowledge and the discipline of mind? Will not the habit of hard and daily manual labor be over difficult to attain after several years of its disuse?

From almost every quarter the answer comes that it is of no use to try. The prediction flew abroad that not one graduate in one hundred would ever work. Shortly the prediction took the form of a fact, and the newspapers reported that as a fact which was only what everybody predicted. You may read it now in the papers and journals from one end of the country to the other. The graduates they all say are not farmers. The schools are all failures.

I am sorry that farmers have joined this cry without waiting to see. For, look you, how dark is the picture? Had it come from examination of facts we might say the schools have been wrongly managed, but when it comes from an expectation and is held to in spite of facts, it shows what the world thinks of labor and of farmers: that the one and the business of the other is in some way inconsistent with a high education.

This is the way the case was put two years ago in a communication of an educated man to a paper of this State. He says the college is a failure because nineteen out of every twenty who graduate there never follow agricultural pursuits. He assigns a reason: And why? Because when a man's brain is educated up to a point where it can provide for the wants of the body without muscular aid, it will do it every time, in spite of all the sophistry and poetry which can be thrown around the life of toil of a farmer.

This is a gloomy reason that forever confines farming as a business to an illiterate class. It is a reason that debars progress forever, and puts a distance forever widening between farmers and others.

[CONTINUED NEXT WEEK.]

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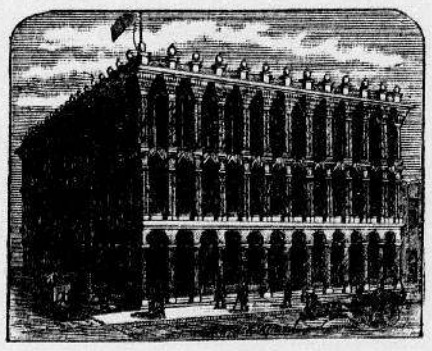

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