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THE
SCHOOL OF AGRICULTURE
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SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

Address during Farmers' Week, January 4, 1909

By THOMAS F. HUNT

WE are here tonight to talk about the work in which we are engaged. We are here to give an accounting of our stewardship. We are your employees, your hired men, if it pleases you so to call us. The moral support that the farmers and other citizens of Pennsylvania have given our work during the past two years has astonished us beyond measure. Upon behalf of my colleagues, I take this occasion to thank you one and all most heartily for it.

The fundamental basis for all progress in agriculture, as well as in all other industries, is the return to be obtained from a unit of labor. It is the application of this principal that has made the industrial progress of the Anglo-Saxon race to exceed that of any other. Many illustrations may be drawn from the field of agriculture. Only a few centuries ago, England raised six bushels of wheat to the acre and reaped it with a sickle. England now raises 30 bushels of wheat to the acre and harvests it with a self-binder. A man with a self-binder and three horses can easily harvest ten acres a day. To harvest this area with a sickle is said to have required the services of 35 men. The human reapers gathered 60 bushels, while the machine, on account of the increase in yield per acre, harvests 300 bushels. This is but one of many illustrations of the combined influence of increase in the fertility of soil and efficiently applied power. Neither do

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we need to stop here. We may carry the illustration further by comparing the flail with the steam thresher, the pestle and mortar with the modern roller flouring mill, and even the Dutch oven with the great mechanical bake-shops. However, all must concede that this last comparison is not altogether a fortunate one.

The same result, namely, increase in the return per unit of labor, may, however, be brought about in quite a different manner. Statistics tell us that the yield of fleece per sheep has increased three times in sixty years in the United States. We get the same size in beeves at two years of age that formerly required four and five years. Within the present generation, farmers that used two 1,000-pound horses have changed their motive power to three 1,500-pound horses. In 1850, the only breeds affecting the cattle of America were Shorthorns. Ayrshires and Devons. Since that time the yield of butter per cow has been greatly increased. The improvement of our breeds of live-stock has thus contributed untold potential wealth to future generations. The improvement of cereals, vegetables and fruits has had a like effect.

We are here dealing not with the fertility of the soil nor the application of motive power, but with the laws of heredity. The vast possibilities in this line can scarcely be estimated. For example, the universal introduction of a strain of wheat which by virtue of its hereditary power produced one bushel of wheat to the acre more than is now produced would mean in Pennsylvania alone an annual addition to our yield of wheat of 1,600,000 bushels. The Pennsylvania Station has one variety of wheat which during eighteen years has produced about thirty-one bushels to the acre, while during the same period the average yield of wheat in Pennsylvania has been about sixteen bushels. How much of this difference in yield has been due to improved seed, and how much to superior soil or better farm methods, no one knows.

**The Influence
of Heredity**

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No one will ever be able to tell precisely. Some suggestion as to the influence of heredity or, as we say, good seed, may be obtained by comparing the yields of the different varieties tested side by side on our experimental grounds under practically uniform conditions as to soil and cultural methods. During the past four seasons, the best average yield of any one variety was 34.8 bushels. The poorest yield was 29.6 bushels, while the average yield of twenty-one varieties was 30.7 bushels. If we assume now that the average hereditary power of twenty-one varieties was no worse than the average of the varieties of the state, it seems reasonable to suppose that the average yield of wheat under proper cultivation could be increased by good seed 4.1 bushels per acre throughout the state. This would amount to more than \$6,000,000, annually obtained practically without cost, not for this year alone or next year, but for succeeding generations, provided that by proper selection or otherwise this standard be maintained. This illustration is not given to claim for the Pennsylvania station any merit for its work, but to point out the vast possibilities in plant-breeding. The improvement in vegetables and fruits has already practically eliminated scurvy and undoubtedly reduced the occurrence of many other diseases of the human race, and "Who," says Luther Burbank, "can estimate the elevating and refining influences and moral value of flowers, with all their graceful forms and bewitching shades and combinations of color and exquisite varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously; and thus, with better and still better fruits, nuts, grains and flowers, will the earth be transformed, and man's thoughts turned from the base destructive forces unto the nobler productive ones, which will lift him to higher planes of action toward that happy day when man shall offer his brother man, not bullets and bayonets, but richer grains, better fruits and fairer flowers."

In the development of the state's resources there are involved two diverse factors: First, the agencies man finds when he is born into the world and, second, his ability to make use of these agencies. It is the function of the experiment station to contribute its share toward improving these opportunities, and it is the duty of the School of Agriculture so to train men and women that they may make the most of their opportunities. We must see that the man behind the gun has a trained eye and a steady hand, and we must also see that he does not have a pop-gun to fire. It seems hardly necessary to add that the greater the opportunities and the more complex the agencies the greater must be the training. It takes a differently trained man to operate a self-binder or a threshing machine than it did to swing a sickle or a flail. The knowledge and insight necessary to maintain and improve breeds of animals and strains of plants is the most profound known to the human race. The business ability necessary to put vegetables and fruits of high quality into the hands of the proper consumers is scarcely exceeded by that of the steel or oil magnate who corrals the markets of the world. If this had not been so, the problem would have been settled long ago.

As the name of the School of Agriculture and Experiment Station implies, its function is both to carry on investigation and to give instruction. When you look over our staff and our equipment and note that we are giving instruction to something over 300 students in residence and to 1,100 or more persons by mail, you must remember that while this is the most obvious part of our work it is only about half of it. That one-half of our activities is in other channels than instruction is not a matter of choice but a matter of law. The expenditure of the funds appropriated by the federal government is quite properly very carefully supervised, so that no part of it

may be diverted to instructional or other purposes not experimental. In a rapidly growing institution with overcrowded classrooms and overworked teachers, the temptation to divert funds from the fundamental experimental work is often great.

There are many good things that we might do, if the law governing the use of the funds at our disposal permitted it. For example, there is a great demand upon every experiment station for bulletins of an informational character, so-called popular bulletins. No part of the Adams fund can be used for publishing bulletins, not even the results of experiments made by funds appropriated under that Act. The Hatch Act says: "That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States and Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the Station will permit."

I do not say that the law has not been given a tremendous twist at times by some of the bulletins that have been published, but it may be safely asserted that if bulletins of a strictly instructional character, such as "How to Grow Alfalfa," "The Culture of Potatoes," or "The Best Varieties of Apples for Pennsylvania," are to be published by this station, the state legislature must appropriate the money for the purpose. We have desired to publish a number of bulletins which we believe would be of value to the farmers of Pennsylvania, which we could not see our way to do under the law and with the money at our disposal.

The average number of persons on the pay-roll of the School of Agriculture and Experiment Station during the past five months has been 158. A considerable number of these have been students receiving pay for a few

hours of work each month. If those who received less than \$25 per month be eliminated, the total number of employees would be approximately seventy-five. What may be called the scientific staff numbers thirty-four persons. This does not include the staff of the Institute of Animal Nutrition, of which Dr. Armsby is Director, consisting of six persons. If the latter be included, there are sixteen persons who devote practically their whole time to investigation, ten persons who devote their whole time to instructional work, and twenty persons who devote a part of their time to each kind of work.

The Experiment Station receives annually \$15,000 a year from the Hatch Fund, and receives this year \$11,000 from the Adams Fund. The State Legislature appropriated \$4,000 for two years for the tobacco investigation. The analyses of commercial fertilizers under the fertilizer control act and a part of the analyses under the food-control act are made by this station for which the State Department of Agriculture pays us in fees about \$15,000 a year. Whatever balance there is left after paying for the expenses of the analyses, and this balance is not large, is used for defraying station expenses. These are the only sources of income for station work. The income for the experiment station has not increased materially since the passage of the Adams Act in 1906.

The passage of the Adams Act and the establishment of the Institute of Animal Nutrition have made possible some additional lines of investigation. It is the custom at this station that before an experiment is undertaken an outline of the proposed investigation shall be submitted to the Director for his approval, and to facilitate the keeping of the record a number is assigned it. Since July 1, 1907, numbers have been assigned to 146 experiments. I am not sure that we should be proud of this record. It may be that we are getting the batter pretty thin.

The experiments in progress may be divided roughly into those in agronomy, horticulture, animal husbandry, dairy husbandry and forestry. The most important piece of work in agronomy is the fertilizer experiments conducted on eighteen acres involving 144 plats during the past twenty-seven years. It is only within recent years that the importance of this investigation has become apparent. It is hoped that nothing will occur to interfere in any way with the investigation for at least another quarter of a century.

During the past two seasons, investigations have been under way to determine, if possible, the reasons for the differences in yield observed on the differently fertilized plats. There have been determined on certain plats, for example, the per cent of water soluble nitrogen, the per cent of water, and the temperature. The lime requirement of certain plats has been determined. It is hoped that eventually these investigations may lead to a better knowledge of the laws of plant growth, and hence to better methods of producing crops. Vast quantities of data have already been accumulated, but very little of practical value has yet come out of it. It seems to me that men who are willing to do this kind of work deserve great credit. I know of nothing more discouraging than to work day in and day out, month in and month out, perhaps year in and year out, trying to solve some of these difficult problems. You are constantly seeing the object of your pursuit dimly in the distance, only to find when you come near that it was a mirage. Men are kept at this work by intense interest in the problems involved.

Variety tests of wheat, oats, potatoes and corn are being conducted. Experiments on methods of selecting and keeping seed corn, on cultural methods with potatoes, on practical methods of growing alfalfa, and studies in the productivity and variation of individual timothy plants and in the kinds and amount of soiling crops for stable-fed herds, are being conducted.

Experiments in horticulture have been recently greatly amplified at this station. A portion of the Adams fund has been set aside for an inquiry into the causes which affect the yield and quality in apples. Some of the specific lines of inquiry are:

Experiments in Horticulture

- (1) The influence of commercial fertilizers and barnyard manure.
- (2) The influence of cultural methods.
- (3) The effect of types of soil.
- (4) The influence of climatic conditions, including elevation and exposure.
- (5) Effects of cions from different trees.
- (6) The influence of amount and time of pruning.
- (7) The influence of fungous diseases.
- (8) The influence of insect enemies.

Orchards in different sections of the State aggregating ninety-one acres and containing 3,660 trees are under investigation. An experimental orchard of twenty-seven acres has been started at the home station. Some idea of the extent of this investigation may be derived from the statement that in collecting data this past season a total of eighty tons of fruit was handled and recorded. In order to determine the current vigor of the trees, measurement of height and trunk girth were taken on each of the 3,660 trees, and 36,000 leaves were gathered, counted and weighed.

Experiments in vegetable-gardening have been organized on the home grounds. A great variety of vegetables are under investigation, but the most extensive experiments are with asparagus, cabbage and tomatoes. It is the aim of the department of horticulture to have the most complete information concerning these three crops possessed by experiment stations or other agencies in America. It may be of interest to state that the gross income this first season from less than seven acres of vegetables under

Experiments with Vegetables

experiment was \$1,025. These returns go a considerable way toward paying the expenses of the experiments, which must, in the nature of the case, always be large.

For six years the effect of shelter upon fattening steers has been studied by feeding half a carload in a basement stable, while an equal number were fed in a yard containing an open shed. As is now well known by all who have read our bulletins, these methods gave equally economical results. Dr. Armsby's experiments with the respiration calorimeter had already suggested that this might be found to be true, since his investigations showed that the exercise of mastication and digestion in a heavily fed steer might indeed be more than was necessary to keep an animal warm, especially if the temperature in which the animal was placed was kept too high. Dr. Armsby's experiments also show that about one-third the energy of a steer's food is saved when he lies down. This suggests a dry, well-bedded stable or shed for fattening animals.

A study of a bulky and medium ration containing an equal quantity of digestible nutrients was begun with a carload of steers last winter, and is being repeated again this winter. A similar experiment is being conducted with the dairy herd. The commercial practicability of the milking-machine is also being tested. Records of a grade Guernsey herd for the past eighteen years have been studied with a view of determining the influence of pure-bred sires in increasing the production of milk and butter, and will be published in the next annual report. The poultry experiments of this station have been reported in Bulletin No. 87.

As previously stated, the state makes a special appropriation of \$4,000 for tobacco experiments, —the only appropriation made by the legislature specifically for experimental work. These experiments are principally along two lines, namely shelter-tent experiments with Sumatra

**Shelter for
Fattening
Steers**

**Experiments in
Cattle Feed**

**Experiments
in Raising
Tobacco**

type tobacco and the improving of strains of tobacco by seed selection. The past summer, a man was maintained in the field, conducting these investigations and studying the method of tobacco-growing in Lancaster county. There is not time to touch on all the lines of investigation carried on by this station. Suffice it to say that the station seeks, on the one hand, to carry on investigations of a fundamental character and, on the other hand, seeks to determine the application of the principles involved to Pennsylvania conditions.

One word should be said before leaving this phase of our subject about the Institute of Animal Nutrition which is an entirely separate agency of research under the direction of Dr. Armsby. The work of the institute of Animal Nutrition is a just pride to State College. It is not duplicated elsewhere in America, if indeed, it is anywhere. Already its investigations have modified the ideas concerning the feeding of domestic animals wherever that subject is being studied, and have attracted the attention of the leading scientists in human physiology. It is conducting a work which the state of Pennsylvania should be proud to support most liberally.

Let us look next at the work of instruction. The additions, both in numbers of departments and in the number of instructors within the departments, have offered opportunity to revise and extend the courses of study. The work of instruction in the School of Agriculture and Experiment Station is along the following lines:

**Lines of Study
in School and
Station**

- (1) Seven four years' courses.
- (2) A special course of two years.
- (3) Five winter courses.
- (4) Farmers' week.
- (5) Correspondence courses.
- (6) Graduate work.

Seven four years' courses in agriculture, leading to the degree of Bachelor of Science, have been outlined as follows :

- (1) Agricultural Chemistry.
- (2) Agronomy.
- (3) Animal Husbandry.
- (4) Dairy Husbandry.
- (5) Forestry.
- (6) Horticulture.
- (7) Plant Pathology.

The freshman and sophomore years are the same for all courses, although the student has an option of certain technical subjects in the second semester of the sophomore year. The freshman year and the first semester of the sophomore year consist chiefly in a training in the languages and the sciences, including botany, chemistry, geology, mathematics, physics and zoölogy. The student is not required to make his final decision as to his major field or course of study until the beginning of his junior year, when he enters upon the more specialized work of his course. Certain free electives are offered in the junior and senior years in order that the student may make his course more general or more technical, according to his individual needs. These courses have been prepared to to meet the existing demand for trained specialists in various agricultural lines.

The special course of two years meets the needs of young men who do not have time to give to, nor preparation to enter, one of the four years' courses. Opportunity is offered in these two years' courses to become proficient in one of several lines of agriculture. While you cannot grow an oak tree in a minute, and, in the nature of the case, a two years' course will not develop a student so fully as a four years' course, two years' training in this course is just as valuable as two years in any other. While some of the subjects studied are necessarily not presented in so much detail, they are pedagogically just

as correct as the more extended courses. This leads me to say a word about the training of the winter courses. It is sometimes assumed that the instruction given in these twelve weeks' courses is superficial, that they give information, not training, that the process is not unlike crate-fattening of chickens—a sudden access of knowledge resulting in flabby mental processes. After years of observation and teaching of every class of students from winter-course students to post-graduate, I am willing to assert the belief that with no other class of students is so much real training given in twelve weeks as is given in these winter courses. This is quite a different matter from stating that twelve weeks can give more training than two or four years.

The following table shows the number of students enrolled during the past three years in the School of Agriculture and Experiment Station.

Students in School and Station	1906-7	1907-8	1908-9
Four years' students	45	90	193
Special students	14	24	38
Winter courses	52	88	92
	111	202	323

The following is a classification of students in the four years' courses in agriculture:

	1906-7	1907-8	1908-9
Seniors	3	5	15
Juniors	5	14	26
Sophomores	14	20	52
Freshmen	23	51	100
	45	90	193

Students in the correspondence courses have increased in like manner. There were 567 new students enrolled for the year ending December 1, 1907, and 1,135 for the year ending December 1, 1908. The following table shows the number of reports received, corrected and returned during the five months of July, August, September, October and November for the years indicated:

	1905	1906	1907	1908
July	108	87	153	218
August	112	120	137	196
September	128	101	120	259
October	229	204	168	509
November	227	275	246	686
Total	804	797	824	1,868

The months of December, January and February are always the heaviest months.

Last summer the school printed 20,000 copies of a circular setting forth the thirty-one courses of instruction

which it offers by mail, but the number of students increased so rapidly that it has not distributed it, for fear the number of lessons

received would be more than our limited force could properly correct. The use of these lessons by granges and other farmers' clubs is increasing, and in some public schools they are being used as a basis for instruction in agriculture and in English. An examination of our records shows that about 30 per cent of our winter-course students, other than those in dairy manufacture, have been previously enrolled in the correspondence courses.

As previously indicated, the School of Agriculture and Experiment Station differs from other departments

in that about one-half of its funds is appropriated for the Experiment Station work and hence one-half its energies is, or

should be, devoted to research or kindred work. This research work leads the citizens of Pennsylvania to look to us for guidance and advice, and brings us into many and diverse relations with various agencies for the promotion of agriculture. These outside relations require a large amount of time of the members of the faculty. This may be illustrated by stating that 246 lectures or addresses have been given outside of State College by members of the faculty of the School of Agriculture and Experiment Station during twelve months. There were over 400 letters received during the week ending April 13,

1908, or at the rate of more than 20,000 letters per year. Many of these letters contain inquiries concerning agricultural topics not infrequently requiring the analysis of samples, the examination of specimens or the search for data, before they can be answered properly.

The analyses of fertilizers and foods for the State Department of Agriculture involve over 10,000 determinations a year, and occupy the almost exclusive time of seven members of our staff. These outside demands upon the school and station are increasing, and we are finding it more and more difficult to meet them.

The Station is coöperating with farmers by furnishing them, free of charge, the necessary fertilizers and giving the needed directions for determining the fertilizer requirement of their soils, with the understanding that the party receiving such fertilizers follows the directions and reports the results to the Station. During 1907, ninety-five applications and seventy-one reports were received. The supervision in Pennsylvania of official tests for admission to the advanced registry of the several dairy-breed associations is in charge of this station. One-hundred and twenty-five animals representing Jerseys, Guernseys and Ayrshires are on yearly tests, while forty-one seven-days' tests of Holstein-Friesian cows have been made.

A butter-scoring exhibit has been inaugurated, in which five-pound packages of butter have been sent to be judged, the scores, criticisms and suggestions being returned to the makers. Over eighty creameries and dairy establishments in Pennsylvania were visited during the season of 1907, for the purpose of gathering information concerning the methods employed therein. While this work was found to be of direct service by correcting faults in operating the Babcock test in the use of commercial starters and in the adjustment of machinery, it has been discontinued during the past year for lack of funds.

Through the suggestion of one of our trustees, Mr. Bayard, educational exhibits were placed in seven county fairs during 1907, and in eleven fairs during 1908. Each fair pays \$50 for this exhibit, and the College pays the additional expenses. The Pennsylvania Railroad ran an educational special in the southeastern portion of the state, in which six members of the staff of the School and Station gave the lectures. Twenty-two stops were made during three days, with an average of about one-hundred persons at each place. Applications are now on file from both the Pennsylvania and Reading Railroads for additional service of this kind in the spring.

At the request of the Director of this Station, the Chief of the Bureau of Soils of the United States Department of Agriculture assigned a soil party to begin a survey of Centre County on April 1, 1907, and during the past season the survey was completed. Acting on the further suggestion of the Station, the United States Bureau of Soils has begun a reconnoissance soil map of Pennsylvania, and ten counties in northwestern Pennsylvania were surveyed the past season. A member of our staff, the instructor in soils, has taken part in both these surveys.

Arrangements were effected through the suggestion of Dr. N. C. Schaeffer, the State Superintendent of Public Instruction, by which courses of instruction were given by members of our staff at two of the state summer schools during last July. These courses were designed to train teachers to present the subject of agriculture in high schools. I have received a letter from the principal of the Mountain Assembly at Ebensburg, which reads in part as follows: "Last year Professor Gilmore was such a splendid man in the department of agriculture at our summer assembly that I am writing to you early in order that we may get some man equally good. We want the strongest man possible in that department. Last year we

had forty students. This year we hope to make the subject of agriculture the all-important subject at our summer school."

At the State Educational Association held here in July, the following resolution was adopted:

"Resolved VI, That in view of the present-day demand for teachers to instruct in agriculture, domestic science, and manual training, and in view of the possibility of using the property of Pennsylvania State College for this purpose, we call on the State to provide a Summer School for teachers at this institution, which shall furnish instruction to teachers in these practical subjects at the actual cost of transportation, board and lodging."

I trust I need not go into further detail to illustrate how many demands are made upon the time and energy of our staff, entirely aside from routine classroom instruction.

The plain and obvious problem of the Dean of the School and the Director of the Station is how to organize

Great Demand this work most efficiently and effectively,
for Teachers and how to make bricks without straw.

The one thing that has been borne in upon me most deeply in the past year and a half is the fact that if this enterprise is to keep its head above water it must be in a position to pay better salaries to members of its staff. During the past year and a half, eight members of our staff have resigned, to accept better positions. One man, to whom we were paying \$1,200 a year, resigned to accept the management of a farm at \$1,600 a year, and another, to whom we are paying much less, is to leave us to take charge of a farm at \$1,500 a year. Another man, to whom we paid last year \$720 a year and were paying this year \$900, has resigned to accept an experiment-station position at \$1,000 a year, with a promise of \$1,200 next year. Another man, to whom we are paying \$1,000 a year, was recently offered \$1,400, and another, to whom we are paying \$1,800, was offered \$2,000. Both these men, I am glad to say, are still with

us, but I do not know for how long. A young man to whom we were paying \$1,200 a year was offered \$3,600 a year to go to Manchuria to assist in establishing a school and station for the Chinese government, and the head of one of our departments, to whom we were paying \$2,500 a year, was elected President of the College of Hawaii at \$4,800 a year. Every time I hear of an especially attractive opening elsewhere, I tremble for fear some member of our staff will be plucked; and, when a younger member of our staff comes into the office and quietly looks me in the eye, I may be sure he is going to announce that he has a better opportunity elsewhere, and desires to offer his resignation and to receive our best wishes.

A member of our staff, who has recently resigned, told me long before he thought of resigning that this was not known as an experiment station but as an
Too much of a Training School experience station—good place to come to get experience before going to a desirable position elsewhere. As it used to be said of a certain county in Ohio, it was a good place to be born, if you only got away soon enough. This constant changing is especially harmful to continuous experiment-station work. I once asked an experiment-station man who was an expert on potatoes, why no experiment station had ever produced a new variety of potatoes, and why the production of varieties of potatoes had always been the result of private effort. Without a moment's hesitation he replied: "Because experiment-station men do not remain long enough in one place."

This is, however, by no means the most important phase of the subject. There are sometimes advantages in having a man resign, provided you can offer enough to get a better man. I have myself rendered signal service in this direction to at least three institutions. Each has prospered immensely since I left it. The number of men that have declined to come here in the last eighteen

months, on account of insufficient salary, is much greater than the number who have left it in the same time for the same reason. Obviously, this is a matter that cannot be discussed in detail, but, were it possible to do so, I could make it clear to you that existing conditions require that, if the School of Agriculture and Experiment Station is to be brought to that plane of usefulness which the people of this commonwealth should, and I believe, do most urgently desire, it must be in a position to pay at least \$3,000 a year to heads of departments and at least \$2,000 a year to assistant professors. Several colleges of agriculture in states of the same class with Pennsylvania do not hesitate to pay from \$3,000 to \$4,000 a year to secure men they wish, or to keep men they do not desire to lose. I could easily prove this to you by mentioning specific instances, if I thought it proper to do so in a public address.

While the most important factor of an institution is the ability of its staff, nevertheless classrooms, laboratories and equipment must be provided for them.

Requisites for Proper Study It is, of course, physically impossible to give instruction if you do not have places for students to sit or desks at which students can work. In the matter of buildings, the state has dealt liberally with the School of Agriculture and Experiment Station. It has spent nearly \$300,000 on buildings which, so far as they go, are not excelled, probably, elsewhere in America. When this group of buildings was planned, it was doubtless thought that they would be big enough to provide for the School of Agriculture for a generation. We moved into the Agricultural Building thirteen months ago. This building has two laboratories, one for agricultural chemistry and the other for soils. The first has twenty-two desks and the second has twenty-four, eight of which are used for research work, hence cannot be used by students. These desks each have two sets of drawers and lockers, and hence by dividing the classes into sections, the agri-

cultural chemical laboratory can accommodate properly forty-four students, and the soils laboratory thirty-two students. Next semester, the department of agricultural chemistry will have not less than eighty students, and in the soils laboratory there will be at least sixty. Next year, there will be not less than one hundred in the soils laboratory, and not less than one hundred and twenty-five in the agricultural chemical laboratory. The library room was found to be too small when the building was first occupied; we therefore took a room away from one of the departments this fall and made a reading-room of it, and now it is crowded. The largest room in the building will seat about two hundred people by bringing in extra chairs. On three days in one week last month, students were required to stand while listening to lectures.

The fact that this building has proved inadequate is not a criticism of any one. This has occurred over and over again in many institutions. Improved facilities always means an increase in the number of students. There is no man living wise enough to predict what will be the needs of The Pennsylvania State College twenty-five years hence.

Our needs are so pressing in many directions that I am sometimes in doubt as to whether one can say that one need is greater than another, but on the whole I am disposed to think that our most immediate need is for a horticultural building and greenhouses. This building is planned to provide quarters for instruction in botany. No efficient and practical instruction in horticulture can be given during a large portion of the academic year without the aid of greenhouses and properly equipped laboratories. The present Agricultural Building was planned to provide one room for horticulture containing about 1,300 square feet of floor space. Our professor of horticulture, however, has suggested plans for a new building containing

four floors, one for botany and three for horticulture, each floor containing 13,000 feet of floor space. If the Legislature should tomorrow make the necessary appropriation for this building, every room would be needed before it could be completed. The present botanical building was designed for both botany and horticulture, and was intended, I suppose, to accommodate a couple of dozen students. Its largest room, used as a combined classroom and laboratory, is perhaps 35x45 feet. Fifty students can be handled in this building with some degree of comfort and efficiency. This semester, there have been enrolled 181 students in botany, not counting the winter-course students who had to be provided for elsewhere on account of the crowded conditions. This is a great horticultural state, the third in the Union in the value of its horticultural products. This institution has, owing to its environment and to the organization of the department of horticulture, a great opportunity to become a leader in horticultural education in this country. With proper support, this is almost as certain as that the sun rises and sets.

What about the support? Can the great commonwealth of Pennsylvania afford it? This matter of appropriation is largely a habit of mind. You are in the habit of thinking of battleships costing \$8,000,000 each, and therefore you do not think one Dreadnought more or less matters; and yet the people of Pennsylvania contribute \$500,000 toward the building of every one of these ships. The legislature of Illinois found it easier to contribute \$2,000,000 to the University of Illinois than did the Pennsylvania legislature to appropriate \$500,000 to The Pennsylvania State College. This is not because there are more people or wealthier people in Illinois or because they have more interest in education, but because they have the habit of supporting their state institution liberally. The people of Pennsylvania need to get the habit.

THE LEGISLATIVE APPROPRIATIONS

EDMUND J. JAMES, President of the University

The legislature of Illinois granted at the last session the following appropriations:

	Per annum	For the biennium
I College of Agriculture	\$50,000	\$100,000
Feeding experiments	25,000	50,000
Experiments in corn-growing	15,000	30,000
Examination of soils	25,000	50,000
Orchard investigations	15,000	30,000
Dairy investigations	15,000	30,000
Floriculture investigations	7,500	15,000
		<hr/> \$305,000
II Ordinary operating expenses	\$450,000	\$900,000
Material for shop practice	5,000	10,000
Increasing cabinets and collections	2,000	4,000
Purchase of books, etc., for library	25,000	50,000
Additions to apparatus and appliances	3,000	6,000
Fire protection	1,500	3,000
Engineering College and Experiment Station	75,000	150,000
Buildings and grounds	14,345	28,690
State water survey	6,000	12,000
Draining, etc., on experimental farms	5,000	10,000
Department of social and political science	25,000	50,000
School of Music	3,000	6,000
Agricultural extension	6,000	12,000
Law School	15,000	30,000
Chemical Laboratory	10,000	20,000
School of Pharmacy	5,000	10,000
Graduate School	50,000	100,000
Veterinary College	..	30,000
School of Household and Domestic Science	10,000	20,000
Additional equipment of the water station	..	3,000
Increasing telephone exchange	..	1,500
Enlarging general heating and lighting plant	..	35,000
For purchase of farm land	..	11,600
		<hr/> \$1,502,790
III Physics laboratory	..	\$250,000
Natural History hall	..	150,000
		<hr/> \$400,000
*Administration Building	..	\$150,000
*Housing College of Medicine	..	386,000
		<hr/>
		\$ 305,000
		1,502,790
		<hr/> 400,000
		<hr/>
Grand total		\$2,207,790

*Vetoed by the Governor

THE PENNSYLVANIA STATE COLLEGE

Deficiency Appropriation by Pennsylvania Legislature, 1907

Agricultural Building	\$85,000 00
Tunnel and Dairy Building	24,169 60
Deficiencies	70,361 32
Total	\$179,530 92

THE PENNSYLVANIA STATE COLLEGE

General Appropriation by Pennsylvania Legislature, 1907

School of Agriculture	\$70,000
School of Engineering	60,000
School of Mining and Metallurgy	50,000
Department of Chemistry	10,000
Department of Home Economics	12,000
General Maintenance	30,000
Science Building	20,000
Enlarging Woman's Dormitory	13,000
Athletic Field	15,000
Tobacco experiment	4,000
Total	\$284,000

It will be noted that the Illinois legislature appropriated \$305,000 for the maintenance of instruction and research in the College of Agriculture, and in addition appropriated \$12,000 for agricultural extension and \$11,600 for additional land. The total amount appropriated by the Illinois legislature was \$2,743,790, of which \$536,000 was vetoed by the Governor, leaving the total appropriation available \$2,207,790. The total amount appropriated by the Pennsylvania legislature was \$463,530.92. The population of Illinois in 1900 was 4,821,000; in Pennsylvania it was 6,302,000. I take it that no Pennsylvanian would care to admit that the per capita wealth was less in Pennsylvania than in Illinois.

The New York legislature meets annually. During the last two years the legislature has appropriated each year \$150,000 to the New York State College of Agriculture, or \$300,000 for the two years for maintenance alone. It appropriated other money for buildings. But this is not

all. The state of New York supports an experiment station at Geneva. During the last two years this station has received from the state legislature about \$180,000 for the maintenance of its work. In other words, there was appropriated by the New York legislature for instruction and research in agriculture \$480,000. During the same period the Pennsylvania legislature appropriated \$74,000. There were in 1900, according to the United States Census, 227,000 farms in New York and 224,000 farms in Pennsylvania. Comment is not necessary.

President James, writing to the alumni of the University of Illinois after the biennial appropriation of \$2,207,790 had been approved by the Governor, said:

“The Governor found it necessary to cut out the appropriation for the administration building, \$150,000, and the appropriation of \$386,000 for the housing of the medical school, making a total of \$536,000. It will be seen, however, that the appropriations finally approved by the Governor are considerably larger than those made for the biennium of 1905-7. This increase in appropriations, although much less than the trustees asked for and much less than the needs of the University require, is still considerable, and will enable the University to improve the quality of its work in many different directions, as well as extend somewhat its scope.

“The income of the University of Illinois is still far below that of other first-class institutions with which, in the long run, the people of Illinois will wish it to be on a full parity. The alumni of the University should not cease to hold before themselves and before the people of the State the ideal of the State University as that of an institution entirely equal to the demands which the rising standards of wealth and education demand.”

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