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## THE COLLEGE OF AGRICULTURE.<sup>1</sup>

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**T**HE College of Agriculture opened at the beginning of the school year in 1909, and was the first college to begin work as a part of the University of the Philippines. It occupies a site of about 95 hectares at the foot of Mount Maquiling, about 2 miles east of the town and station of Los Baños.

The college was established primarily for the purpose of furnishing proper higher education and training for farmers in the Philippine Islands. Incidentally, training is given for the service of the Philippine Government in agricultural lines. It has also a department of forestry which trains young men to enter the service of the Bureau of Forestry.

The chief course in forestry provides training for forest rangers. For this course, the Bureau of Forestry sends about 50 pensionados, and there are also students from China and Guam. The nominal entrance requirement for this course is two years of high-school work; practically, more than this is required, because nearly all recent appointments to pensions have been given to high-school graduates. The natural advantages for this course could not be better than they are, with the Maquiling forest reserve immediately adjoining the campus. The Bureau of Forestry has furnished, by detail from its corps, a very strong faculty, and the work in this course has at all times been exceedingly satisfactory. For those who are conspicuously successful as students, and afterward as rangers, additional instruction is provided leading to the degree of bachelor of science, and furnishing the necessary education and training for higher positions in the Bureau of Forestry.

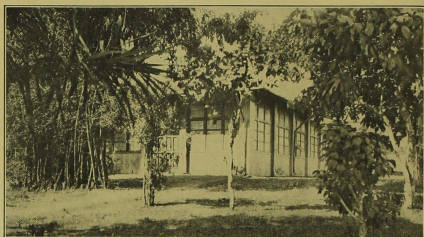
In agriculture, three courses are given—A course of six years to which graduates of the intermediate schools are admitted; a course of four years for high school graduates; and a special course, which does not lead to a degree, of a single year, for the training of teachers of agriculture in the public schools. This special course is given to pensionados of the Bureau of Education. Appointment to these scholarships is made by the Director of Education on the recommendation of the division superintendents. Appointees must have at least two years' experience as teachers.

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<sup>1</sup> Photographs by E. M. Ledyard.

The course of study, as compared with those in American colleges of agriculture, present two peculiarities. The first of these is in the scientific foundation which is given to the subject of agriculture. In its thoroughness, this is probably not very different from that in reputable American colleges, but it differs in that the chief emphasis is laid on botanical instead of chemical training. Chemistry is, of course, taught to all students, as are also zoölogy and physics. Chemistry is taught daily for two years, covering the rudiments of the subject, the application of chemistry to agricultural problems, and thorough laboratory practice in the chemistry of the greatest importance in Philippine agriculture, such as sugar, starch, and nitrogen determinations.

Botany is taught as the very basis of plant industry. It is

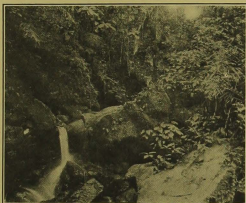


Chemical laboratory.

taught with the emphasis and thoroughness which can be seen to belong to it, when it is realized that plant production is essentially applied botany on a large scale, and that Philippine agriculture is almost entirely plant industry. Before students in the six years' course begin the study of field crops, they have two years of daily work in botany, in the laboratory, and in the field, and have learned from their own experiments how the growth and production of plants are controlled by the conditions under which they grow and by the treatment they receive. The students are drilled in the study of the growth of plants until they can determine easily and accurately the rate of growth; and they make these determinations in such numbers, that by comparison they can determine in a day whether or not any plant

is growing as it should. More than a half million such determinations have been made at the college. Water cultures and plot experiments with fertilizers with various plants are made as a part of the course in botany.

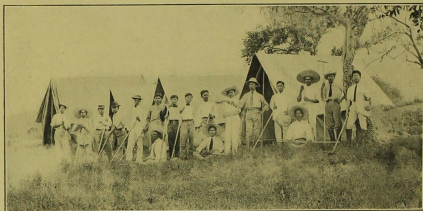
The other peculiarity of the course in this college is the requirement of enough practical work from every student to be sure that he is personally familiar with every ordinary operation on a thoroughly well-equipped and properly conducted farm, and can perform all of these operations himself. These operations have been grouped under some eighteen heads, and aside from the completion of the courses as catalogued, the candidate for graduation must have records showing that he has demonstrated his proficiency in each operation under each head. These operations range from the use of the hoe, plow, cultivator, etc., to the repair of machinery, the use of insecticides, the selection of seed, and the preparation of products for market. No graduate will be required to perform all of these operations in actual farming. Some he is sure to have to do himself; others he is more likely to direct, but he cannot be expected to direct competently what he cannot do; still others may confront him or may not. The intention is to prepare him for any test he is likely to meet.



Falls near college.

In connection with a College of Agriculture, as a part of the work of the students, and as a demonstration to the student body, there should be a model farm. In the early days of the college, the small number of students, the very limited supply of labor, and the bad condition in which the land was acquired, made it impossible to maintain a proper farm. These difficulties have now been outgrown, and the farm is a place where the students can see many crops raised as they would be on a model hacienda, except on a smaller scale, and where the students during the first two years of the course, when they are not yet themselves studying agronomy, acquire by contact an excellent, even if altogether superficial, idea of good tropical agriculture.

The work of the farm falls under three heads: Nursery, test plot, and field cultures. Small lots of seed and material for propagation are continually being received from various parts of the Philippines, and from many other parts of the world. As a rule, these are germinated in the nursery, and kept there until their test is completed, or they are ready to be transplanted to other parts of the farm. The test plots may receive plants from the nursery; or small lots of seed of field crops, garden vegetables, and ornamental plants may be planted directly in these plots. All of the work in the nursery and test plots is done by students, either as required work in connection with class work on the individual kinds of plants, or as work for an hourly wage. The fields are used for plants which have already been selected in the trial plots, and otherwise never, except to provide food for the

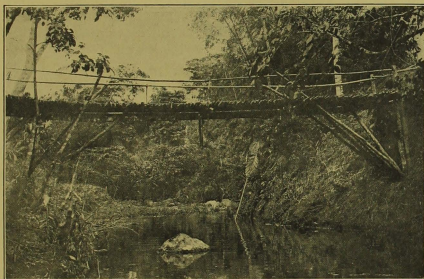


The college in 1909.

live stock on the farm. In order to furnish feed for stock, maize is raised on a larger scale than any other field crop in cultivation. Every plant of maize on the college farm is grown from selected seed. The next largest area is at present occupied by cassava (camoting kahoy). We know this to be the plant which will furnish food for the Filipino people at the lowest cost and least expenditure of human labor, and we believe that we can put this food into a thoroughly palatable form. Another large area is given to sweet potatoes, of which, as in the cases of maize and cassava, every plant is pedigreed. The most of the field work is done by hired labor. Students are required to plow, harrow, cultivate, etc., until they demonstrate that they can perform each operation well, and no longer. Other crops which have been cultivated here on what can be called a field scale are

coconuts, abaca, sugar, rice, various legumes, both for the crop and to improve the soil, and guinea grass, and other forages for the use of cattle and hogs. Everything that grows on the farm is under careful observation and is a subject for careful records. The number of distinct cultures on the farm during the past year was more than 2,000.

Farm work in a Government institution is of two kinds—experiment and demonstration. At the college, the larger part of the work is experimental. In the schools and on the Government farms of the Islands, the work should be almost or quite exclusively demonstrative. An experiment, to be really complete, must show the difference between good practice and bad practice.



First bridge at the college.

It is in the nature of experimental work that a large part of it will give results, which in the sense of an experiment are successes, although as a matter of practice they could only be regarded as failures. The student learns from this practical failure as well as from the practical success; while the mere observer of the experiment which does not show good practical results will learn nothing, and will be very likely to draw the erroneous conclusion that those who make the experiment do not know their business. A real experiment is, therefore, out of place in a farm or garden operated for the education of a community. Its place is on the college farm where its nature is understood by the student body; or on the private grounds of an individual who knows how to

conduct it, and to draw his lesson from it. During the first year of the college when but little land was in cultivation, practically all of the work had to be experimental, and many visitors carried away the impression that poor farming was the rule here. This condition is now thoroughly outgrown, and there is enough demonstration work, and this is conspicuous enough, so that while very many experiments are going on at all times, the appearance is usually rather that of a garden.

Agricultural investigation is carried on at the college by whole classes, by single advanced students, and members of the faculty. Of real investigation, that is, work intended to establish facts hitherto unknown here or elsewhere, and therefore valuable for publication in the Philippines and other tropical countries, fully 95 per cent of our work is done by individual students working under the direction of the members of the faculty. The faculty member called upon for the most of this supervision is the professor of agronomy. An idea of this work can be obtained from a mention of some of the subjects.

Working on rice, one of the first graduates found that the application of certain chemical substances, which are not plant foods but are rather to be regarded as stimulants, produce such an increase in the rate of growth, that the increased production on a field scale can be expected to pay for many times the cost of the substances applied. Another student has made a comparative test of 26 kinds of upland rice, and has determined their differences and the respects in which various ones are superior. This work was carried as far as various methods of preparation for the table. The work showed that 2 of the 26 stood decidedly above the others in amount of production. From the whole plot of each variety, the 4 best heads were selected and the seed from these was sown in test rows. This crop has also been harvested, and shows a marked increase in production over the average from the first crop. The statistics are not all tabulated, but it appears that careful selection of seed, an operation which would provide in a day seed enough for a great many hectares, has resulted in an increase in crop of about 20 per cent. Twenty per cent addition to the crop from 1 hectare would pay for a great many days' work. This seed is all saved, and after one more crop has been raised will be ready for distribution in small quantities.

The selection of maize seed has resulted in a very conspicuous increase in the crop and in the value of the single ear. Aside from this general work, one of the advanced students has produced a hybrid between an imported variety of white dent, and



the best local yellow flint, which promises to be a marked improvement over either parent in productivity. This hybrid will need to be purified by one more generation before it is ready for distribution.

One of our graduates who worked at sugar proved that the most of the commercial fertilizers in widest use in the Islands would not pay for their application to our soil, but that one of the mixtures paid a good profit above its cost. His work has been published in the *Philippine Journal of Science*. The work of other graduates is published in the *Philippine Agriculturist and Forester*, a journal managed and edited by the student body.



Students and gardens.

Our work with cassava began with the assumption that we had four varieties—the local one, and three others from Mindanao, which in various single respects were superior. A careful study has shown that instead of four clear cut varieties, there are a much larger number of distinct strains present, and these are now being bred out by pedigree cultures. It has already been established that some of our strains are very much more productive than any previously known to exist.

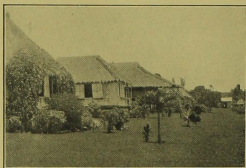
One of last year's graduates made a comparative study of 23 varieties of sweet potato. From this study it developed that some of the varieties were worthless and that some were very productive and also very savory. On the whole, the best of

these, according to local judgement, and the students ate enough to qualify as judges, is the variety known as Samar big yellow. Cuttings of these have been distributed and more are available.

Another student made a study of the value of the tree known as ipil-ipil, or Santa Elena, as a purveyor of nitrogen to the soil. The Department of Forestry has already settled upon this plant as the most valuable crop for planting on cogon land, to get rid of the cogon, and at the same time pay for the operation by furnishing a high grade of firewood. The annual yield of firewood according to exact figures which have been obtained from one plot is 88 cubic meters a year per hectare, a figure far in excess of what is said in text-books of agriculture to be the highest possible yield of dry material from a hectare of ground. The research of the student showed that at the same time that cogon was killed out and firewood was produced, nitrogen was

added to the soil to an amount which would have cost ₱55 per hectare at the lowest local price of nitrogen in fertilizers.

One of the present senior class is making a study of gabi (*Colocasia antiquorum*) and the related food plants. More than 60 supposed distinct varieties are included in this work, and on each of



Students' houses.

these he has determined the rate of growth and amount of production, and is making chemical analysis showing the food value of the harvest. One of these varieties has already been proven, on a trial plot, capable of producing a crop at the rate of 130 tons of "roots" per hectare, and these "roots" are more palatable than the gabi itself. A large part of this great production is water; but the dry matter in this and the cassava crop, like the wood crop of ipil-ipil, is very far above the supposed maximum possible production.

The most interesting work at present being done on the farm is probably that with tobacco. For our tobacco, we have used seed from Cuba, Sumatra, Connecticut, Syria, and other foreign countries and the Philippines. In short, it has included every well known tobacco variety supposed to be of particularly high grade. With several of the imported varieties, as well as the

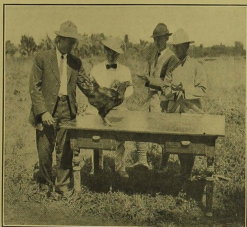


native, very fine tobacco leaf has been produced. One of the students has produced a hybrid between Cuban Vuelta Abajo and Isabela tobacco which seems at present to be superior to everything else, and is being tested on a larger scale than any other variety.

Investigational work has also been done, and is being done, on coconuts, abaca, coffee, forage plants, a considerable number of less-known field crops, a large number of varieties of garden vegetables, and various plants of local use, some of which seem to be worthy of widespread cultivation. Work with very many kinds of fruit trees is also under way, but with these crops results necessarily take so long that we are not yet near them.

Careful experiments on the feeding of hogs have been carried on for many months and are still under way. One

of our graduates made a study of the Philippine chicken, and came to the conclusion that badly as it compares with various standard breeds of chicken, as a source of either meat or eggs, it still does better than any standard breed could be expected to do under the same lack of proper treatment. This student found his birds pestered with fleas, which could



Judging chickens.

not be kept away by the methods described in the poultry books; but he found a local tree, the leaves of which kept the nests entirely free of vermin.

As a matter of demonstration, silkworms are grown at the college, and all students are drilled in every step of the silk-producing industry. On a large scale, it would perhaps not pay to produce silk in the Philippines, but as a household industry it deserves to be taken up throughout the Islands.

Almost every province is represented among the students, the largest numbers naturally coming from the neighboring Tagalog provinces. The students from some of the provinces have organized provincial clubs, and there are also larger clubs of students from groups of provinces; and still others composed of

students with special interests, such as oratory, German, or tennis.

All of the students are organized into a student body, which has control, through its committees, of athletics, social affairs of all kinds, and publications. The publications are *The Plow*, an annual, and the *Philippine Agriculturist and Forester*, intended to appear monthly during the college year. This magazine has published the theses of the graduates, and many other papers by students, including the results of investigations on the ground, or of local industries of the Philippines, such as the duck and egg business of Pateros, and the pandan industry of Majayjay. It has already published more scientific work by Filipinos than any other journal has ever done.

Nearly all of the students live in groups, each occupying a house. The most of these houses are on the campus, some owned by students, some by the Bureau of Forestry and occupied by its pensionados, and some built by a club organized for the purpose. Board was furnished at cost at ₱8 a month for a part of this year, under the management of a member of the faculty. This undertaking is now in private hands, and the price has been raised to ₱10. The living of some students costs considerably more than this, and of others a little less. A great many of the students are self-supporting. There are various opportunities for students to earn their way. The college employs all students who desire work, at field work at the rate of 10 centavos an hour, so long as the class work of the student is satisfactory. Among the more advanced students a considerable number are employed at a monthly wages of ₱10 to ₱25, as assistants in offices, laboratories, the library, and in the fields and as janitors. Other students are employed by members of the faculty. One group maintains a store which sells supplies of all kinds wanted by the college boy. The most prosperous self-supporting student is probably the one who furnishes music for the *Los Baños* cinematograph.

Lively interest is taken in athletics, and in the intercollegiate contests. Agriculture has to date the best record of any of the colleges. Remote from doctors and hospitals, the student body seems to impress every visitor as made up of exceptionally strong and healthy young men. For this, the outdoor life and fresh air are probably largely responsible, but the neatness, openness, and general sanitary condition, which have brought the student community the name of a model barrio, are entitled to a share of credit.

The college intends that its graduates shall be good men and good citizens, as well as good farmers. The barrio is maintained as a barrio should be, and students in it are required to keep their premises presentable at all times, and to live as young men should. The student body was organized and given a large amount of responsibility, to provide real and practical training in civic affairs. The college is young, and the course of study long. Not many farmers have yet been graduated, but every graduate has found employment awaiting him. The admirable spirit of the students, individually and collectively, is so far the best evidence of the kind of work the college does.

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#### CURRENT COMMENT ON MANUAL TRAINING.

"One of the chief values of shopwork, weaving, gardening, etc., even in elementary schools, is that they introduce the pupil to natural facts and forces and give him a motive for becoming thoroughly acquainted with the concrete facts and laws of nature."

"The best values in manual training are in the habits, ideals, and attitudes it fosters. It interests many pupils who are not successful in other school studies, gives a sense of capacity, power, and effectiveness to many a boy who is almost ready to accept the teacher's estimate of incapacity and worthlessness."

"Shopwork systematically carried out engenders a habit of industry and observation that cannot be acquired in any other way. It gives to the inmate a knowledge of the difference between accuracy and vagueness, and an insight into the complexity of everyday life, which, once wrought into the mind, remains there as a lifelong possession. Work in the shop will confer upon the inmate precision; for under a competent instructor he must do the work that is laid out, definitely right or definitely wrong."

"It is only when one has experienced the shock of misfit between what he has thought will hold, on the one hand, and what he finally finds to be true, on the other, it is only then that one is really sharpened to the point of developing good judgment. Leave out the test of practice, and people can think all sorts of things and be entirely wrong. We need headers such as practice brings, in order to develop sanity or efficiency. Manual training, because it provides this test, is superior to many other subjects. A well-educated man is one, therefore, who can do as well as know, and efficiency is a good term for the statement of the aim of education, because it includes these two factors."