PURDUE UNIVERSITY
Agricultural Experiment Station

Circular No. 24

LAFAYETTE, Ind., July, 1910

AGRICULTURAL EXTENSION
VIII

INFORMATION ON WORK OF PURDUE EXPERIMENT STATION AND SCHOOL OF AGRICULTURE

The field occupied and the amount of work accomplished by the Purdue University Agricultural Experiment Station and School of Agriculture, is increasing rapidly each year. Increased funds and equipment have allowed the men in charge to attack the agricultural problems in an extensive and thorough way, thus enabling them to secure much interesting and valuable data. Results of and information concerning the various lines of work have been published in bulletins and circulars.

The number of each bulletin and circular printed and distributed in the state has been small compared with the total number of farmers and others directly interested in agriculture. The number has been limited because of a lack of funds and for the further reason that all people are not interested in all the subjects treated. It is therefore deemed advisable to have parties acquaint them-selves with the work of the departments and apply for bulletins and circulars in which they are directly interested.

To supply the general information relative to the Experiment Station and School of Agriculture, this circular has been prepared. In it will he found a brief outline of the work of the various departments with the name and number of recent publications available for distribution. Persons interested in further details of the work mentioned should write for bulletins and circulars.

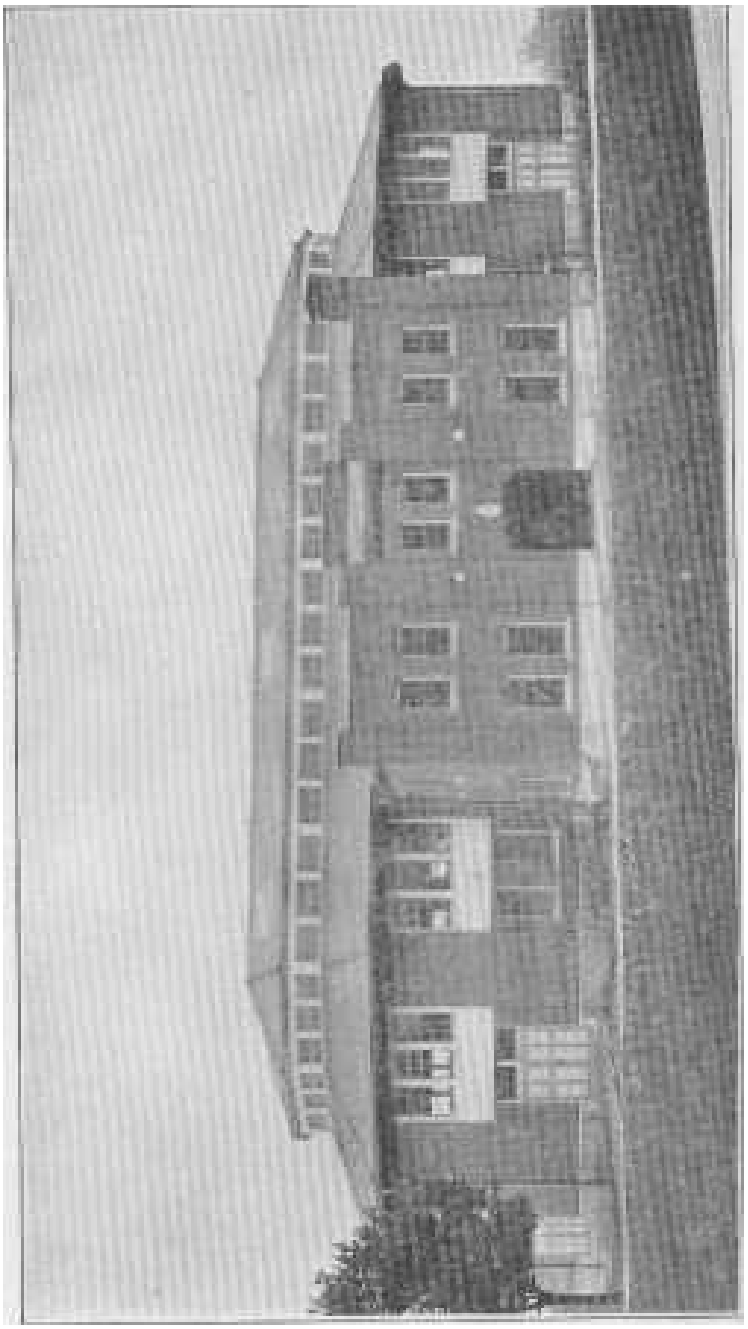


Fig. 1. The new Purdue live stock judging pavilion

PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

Arthur Goss, Director

The Agricultural Experiment Station was organized in 1887, under the act of Congress known as the Hatch Act. It employs a staff of scientists, skilled in agronomy, animal husbandry, dairying, horticulture, botany, chemistry and veterinary science. These workers are engaged in collecting scientific facts and truths applying to agriculture, preparing bulletins and answering correspondence. Further support was given to this work through the passage of the Adams Act by Congress in 1906.

Through the act of the Indiana State Legislature of 1905 the Station was enabled to take up new lines of investigational work and to establish a department of agricultural extension. Already much work has been accomplished through cooperative experiments in soils, field crops and horticulture, extensive cattle feeding experiments, herd tests, county experiment stations, special educational trains, fair exhibits, district short courses, newspaper articles and addresses made by the workers at the various state and county meetings of the agricultural organizations.

To advance the lines of work of the Experiment Station already under way and to meet the urgent demands for information on new problems, the State Legislature of 1909 increased the Station maintenance fund to $75,000 per annum. Of this amount, $15,000 are used for soil and crop improvement; $10,000 for dairying; $10,000 for animal husbandry; $5,000 for poultry; $10,000 for horticulture; $5,000 for hog cholera and other animal diseases; $10,000 for agricultural extension and $10,000 for general expenses.

In addition to the investigational and extension work, the Experiment Station administers through the office of the State Chemist, the Fertilizer Control Law passed in 1901 and the Stock Food Control Law passed in 1907 by the Indiana State Legislature.

In these ways the Station has become a source of definite information and helpfulness for the entire agricultural class of the state.

AGRICULTURAL EXTENSION DEPARTMENT

G. I. Christie G. M. FRIER HELEN H. HENRY

The work of the Agricultural Extension Department consists in promoting schemes that carry to the people of the state information relative to the work of the Experiment Station, School of Agriculture and agriculture in general, The object of this work is to reach in a direct way people remote from the institution and to acquaint them with the best and most up to date information on agriculture.

The most important of the lines of work carried on are as follows:

DISTRICT SHORT COURSES

The District Farmers' Short Course is an outgrowth of the Annual State Farmers' Short Course held at Purdue. It is the result of a demand on the part of the people for advanced practical agricultural instruction to he given at points in the state conveniently located and easily accessible.

During the past year courses of one week each were given in the first, sixth and ninth congressional districts. Instruction in crops, soils, animal husbandry, horticulture, dairying, poultry and domestic science was given by representatives of the various departments of the Station and School. The work consisted of practical judging, demonstrations and lectures and was of great value and helpfulness to all.

The interest taken in this work is shown in a measure by the large attendance.

District	Town	Attendance
First	Evansville	2137
Sixth	Greensburg	776
Ninth	Veedersburg	444

During the coming year courses will be held at Evansville, Terre Haute, Richmond, Muncie, Huntington and South Bend. Large towns with good railway facilities and ample accommodations in the way of buildings have been chosen because of the large number of people who desire to attend these courses.

SMALL SEED IMPROVEMENT

In cooperation with the Bureau of Plant Industry of the U. S. Department of Agriculture the Experiment Station has established a Branch Seed Laboratory. This laboratory furnishes an opportunity for any one, either farmer or seedsman, to submit samples of seed of agricultural crops including clover, alfalfa and grasses for examination as to the presence of obnoxious or other weed

seeds, chaff or dirt. Samples of seed submitted are also tested for germination. The reports on samples analyzed give the per cent. of pure seed, inert matter and foreign seed, the names of weed seeds found with the approximate number of seeds of each in one pound of the sample and per cent. of germination. With this data the farmer or seedsman is in a position to decide as to whether or not he wishes the seed in question.

The seeds of clovers mid grasses furnish a medium through which many obnoxious weeds gain access to the farms of the state, and farmers should exercise every care in selecting seed. The Department of Extension will analyze, test and report free all samples submitted. Up to June 1, 685 samples have been examined at the laboratory, showing a general interest in the improvement of the crop seeds.

FAIR EXHIBITS

During the fall of 1909 exhibits were made at the county fairs held at Hagerstown, Newtown, LaFayette, Crawfordsville, Converse, Rushville, Muncie and Middletown, at the Indiana State Fair and at the National Corn Exposition. These exhibits consisted of a graphic display of the work of the Experiment Station and School

Fig. 2. An exhibit of small seed improvement work

of Agriculture. The exhibit materials consisted of grains, fruits, spraying materials, pictures, bromides, charts, weeds, seeds, etc. Representatives of the Station and School accompanied the exhibits and explained the work to visitors. In this way the exhibits were directly educational and were much appreciated by the people. The attendance at the county fairs alone was more than 127,000. This year exhibits will be made at 20 county fairs and the Indiana State

YOUNG PEOPLE'S CONTESTS

The Department of Extension in cooperation with the Farmers' Institutes is assisting in the organization of young people's contests. At present more than 50 counties are organized with about 12,000 boys and girls.

The work consists of corn growing, bread making, sewing, fruit canning, etc. At a show held in the fall each member will exhibit products of the season's work together with a write-up of how the work was done.

These contests are popular and are doing much to interest the young people in the movement for a better agriculture and a better home life.

RURAL SCHOOL AGRICULTURE

At the present time there is a strong demand for information on methods of teaching agriculture in the rural schools of the state. To assist in this movement and to be of helpfulness to the school teachers, the Extension Department has carried on some work. At each district farmers' short course a two days course was given for school teachers. In this course methods of teaching agriculture were demonstrated, the subjects of corn judging, weed seed identification, horticulture and domestic science being taken up. More than 450 teachers were enrolled in these courses and it is felt that much was accomplished for the teaching of agriculture.

At this time the Department is preparing collections of weed seeds, which are to be distributed among the teachers of the state for their use in class work. These collections consist of 35 common weed seeds and will aid the teachers in the identification of weed seeds brought in by pupils. A small fee to cover cost of preparation is charged for this collection. Anyone wishing same should apply to the Extension Department.

HORTICULTURAL DEMONSTRATIONS

The Departments of Horticulture and Extension have cooperated in holding demonstration meetings at various points in the state. At these meetings practical demonstrations in the making of spray mixtures, applying same, pruning of trees, etc., were made, On these occasions lectures on location of orchards, management of

orchards, control of insects and plant disease were also given. These demonstrations have proved popular and have done much to arouse interest in the subject of fruit growing

During the coming fall similar meetings will be held in the state. Those interest should apply for information relative to the holding of these meetings.

Fig. 3. One corner of the County Fair exhibit

LIVE STOCK JUDGING CONTESTS

A recent circular has been issued by the Departments of Animal Husbandry and Extension on Live Stock Judging Contests at County Fairs. In this circular the plan for stock judging contests is set forth and the county fairs are urged to inaugurate a contest. Already more than 10 county fair contests have been arranged. The Extension Department furnishes a judge for these contests while the fair management supplies the premiums. The object of these contests is to interest the young people in live stock and at the time direct their attention towards the state judging contest at the Indiana State Fair where $500 is offered in premiums, in the form of scholarships in the Purdue School of Agriculture.

Last year 20 boys took part in this state contest and this year, it is hoped that more than 100 will compete. Any one interested in these contests should apply for information.

Fig. 4. Farmers inspecting cows on Erie dairy train

Fig. 5. Inspecting cattle at recent Cattle Feeders' convention

AGRONOMY DEPARTMENT

A. T. WIANCKO M. L. FISHER C. O. CROMER

The ultimate object of the work of this Department is to bring about improvements in field crop production by testing and introducing improved varieties and valuable new crops throughout the state, by improving the best existing varieties or strains through systematic breeding, by studying soil preparation and general cultural methods, systems of cropping and crop rotation, etc.

The following are some of the more important lines of work in progress:

Fig. 6. Threshing varieties on the Station farm with a small-size separator run by a gasoline engine

1. Testing the value of new and promising varieties of all kinds of grain and forage crops of interest to Indiana agriculture.

2. The improvement of the leading farm crops by systematic breeding and selection, including studies of methods. The corn breeding plots are located in different parts of the state with the object of producing, in each case, a type of corn particularly suited to that locality.

3. Studies of the relative productiveness of several different types of seed ears selected from the same variety of corn.

4. A study of the relative value of lots of seed corn selected at different stages of maturity.

5. A study of the longevity of various farm seeds when stored under ordinary farm conditions.

6. Studies of the relative merits of various corn cultural implements, and various systems of corn cultivation.

7. Studies of the relative merits of various systems of crop rotation on three different soil types.

8. Testing different rates of seeding, distance and methods of sowing soy beans and cow peas.

9. Experiments to determine the adaptability of alfalfa to various conditions throughout the state, and the relative merits of summer and early fall sowing of alfalfa, with and without the application of lime. Over 100 such experiments are under way and some are located in nearly every county of the state.

Fig. 7. Harvesting broom corn varieties. Yields range from 500 pounds to 1000 pounds per acre

10. Cooperative tests of leading varieties of corn, oats, wheat, cow peas and soy beans. These tests include from four to five of the leading varieties of each crop, and are distributed as uniformly as possible throughout the state, from six to a dozen or more being located in each county. The total number of such tests going on this year is 782.

Publications. Among the recent publications of results of the work of the Agronomy Department are the following:

Bulletin No. 110 (revised edition) Corn Improvement.

This bulletin contains a discussion of seed corn selection, test-

ing and preparation for planting, methods of corn breeding and special seed production, with full discussion of the corn score card and its use in corn improvement. It also contains numerous photographic illustrations to aid the farmer in selecting good seed corn.

Bulletin No. 114. Winter Wheat.

This bulletin contains the results of tests of 68 varieties of wheat on the University farm from 1901 to 1906 inclusive, and includes descriptions of the varieties, discussions of their relative milling qualities, and analyses showing relative nitrogen content, and a general discussion of the best methods of wheat production.

Fig. 8. Cow peas and soy beans after wheat 1909. Cow peas in front of the man: soy beans behind him. Sowed July 10.Green weight Sept. 29: cow peas 10.8 tons per acre; soy beans 9.3 tons. In the soy beans there were 130 pounds nitrogen in the tops and 14.4 pounds in the roots, worth $18 per acre. Cow peas not analyzed

Bulletins Nos. 117, 124, 132 and 139. Results of Cooperative Tests of Varieties of Corn, Oats, Wheat, Soy Beans and Cow Peas.

These bulletins contain the results of tests of several leading varieties of each of these crops on several hundred farms through-out the state during 1906, 1907, 1908 and 1909. Bulletin No. 139 contains summaries of the results of these cooperative variety tests during the last four years.

Bulletin No. 120. Soy Beans, Cow Peas and Other Forage Crops.

This bulletin contains the results of several years' tests of

varieties, descriptions of the varieties of soy beans and cow peas tested, the result of tests of various cultural methods, the value of various forage crops for growing in succession for soiling purposes, and a general discussion of the conditions necessary to the successful production of soy beans and cow peas, both of which seem destined to become important crops in Indiana agriculture.

Bulletin No. 122. Alfalfa in Indiana.

This bulletin contains the results of experiments on about 70

Fig. 9. Using the fanning mill to improve the seed. This is one of the most effective methods of crop improvement

farms, in as many different parts of the state, to determine the adaptability of alfalfa to various soil conditions, various methods of seeding, and the best time of year to sow, with a general discussion of the value and use of alfalfa, and what is so far known concerning the conditions necessary to its successful production in Indiana.

ANIMAL HUSBANDRY DEPARTMENT

J. H. SKINNER H.P. RUSK

The aim of the Animal Husbandry Department has been to study practical problems confronting Indiana farmers and answer questions of vital importance to the success of those who are handling beef cattle, hogs, and sheep. The Department is well equipped to study the different phases of this work, especially with reference to the feeding of cattle and swine. Broadly speaking, the work of this Department is of two distinct classes:

1. Experimental investigation,
2. Extension, or the dissemination of information.

EXPERIMENTAL INVESTIGATION

The Equipment consists of a storage barn, silos, feed lots, sheds, racks, troughs, and mangers, to feed 140 steers and 200 pigs at one time. The equipment for this work, while good, is not expensive, and is so arranged that the results obtained usually may be applied to conditions on Indiana farms. The cattle are fed in lots 40 x 50 feet with a 12 foot open shed on the west. The experimental pigs are fed in lots 26 x 71 feet in which there is a house 8 x 10 feet.

They are fed in round bottomed metal troughs set on concrete platforms. The sheep barn is a plain bam with combination grain troughs and hay racks inside and a wide open shed facing south, on the cast of the main barn.

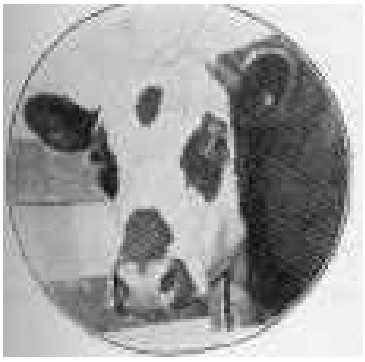


Fig. 10. A good feeder's head Daily gain 3.44 pounds

Fig. 11. A poor feeder's head Daily gain one pound

Cattle Feeding.—The experimental cattle feeding during the past five years has involved over 500 head of steers. The results of this work have thrown light on some of the more important problems confronting the feeder as follows:

1. The influence of age on the economy and profit of beef production.

2. The value of and extent to which silage can be used in the ration for fattening steers as measured by the rate and cost of gain, finish of the cattle, and profit.

3. The importance and value of nitrogenous concentrates as shown by the rate of gain, cost of gain, feed consumed, and profit as well as the influence on the carcass.

4. The influence of different proportions of nitrogenous concentrates in the ration for fattening cattle.

5. The relative merits of "long" and "short" feeding periods for two year old cattle.

6. The results of finishing cattle of different ages.

Publications—

Bulletin No. 115. Steer Feeding.

Bulletin No. 129. Steer Feeding II. Winter Steer Feeding 1906-7 and 1907-8.

Bulletin No. 130. Steer Feeding III. Results of Short vs. Long Feeding Periods.

Bulletin No. 136. Steer Feeding IV. Winter Steer Feeding 1908-9.

Bulletin No. 142. Steer Feeding V. Finishing Steers. (A summary of three years' work)

Part I—Dry Lot vs. Pasture for Finishing Yearlings.

Part II—Finishing Two Year Old Steers.

Part III—"Short-fed" Cattle at 1908 International.

Bulletin No. 146. Steer Feeding VI. Influence of Age on the Economy and Profit from Feeding Calves, Yearlings, and Two-year-olds. (A summary of three years' work)

Circular No. 8. Purchasing Feeders.

Circular No. 12. Methods of Beef Production in Indiana.

Circular No.14. Factors which Influence the Value and Cost of Feeders,

Pork Production.—The work of pork production has been in progress more than 15 years and much valuable information has been obtained and disseminated in regard to experimental work with feeds, such as tankage, skim milk, butter milk, linseed oil meal, soy beans, middlings, etc.; a study of the cost of maintaining brood sows, and growing pigs in winter on different rations, has been in progress for some time.

Other problems receiving attention are—

Influence of different proportions of water to feed for growing fattening pigs, the influence of Yorkshire blood on the Poland China and Berkshire breeds, a study of bacon types of hogs, and the economy and profit of forage crops in pork production, the relative economy and profit of hominy feed as compared with corn.

Fig. 12. Experimental pig lots and houses

Publications available—

Bulletin No. 108. Soy Beans, Middlings, and Tankage as Supplements in Pork Production.

Bulletin No. 126. Supplements to Corn for Fattening Hogs in Dry Lot.

Bulletin No. 137. Dairy By-products as Supplements to Corn for Fattening Hogs.

These bulletins give the rations used, the amount of grain required to produce 100 pounds of pork, and the rate and cost of gains made by hogs under different methods of feeding and management.

Mutton Production.—This important branch of Animal Husbandry has not received the attention in the past that it merits. However, a study of maintenance rations involving dry and succulent feeds (silage) for breeding ewes in winter and the production of "hot-house lambs" has been made during the past four years.

Publications available—
Bulletin No. 147. Corn Silage for Winter Feeding of Ewes and Young Lambs.

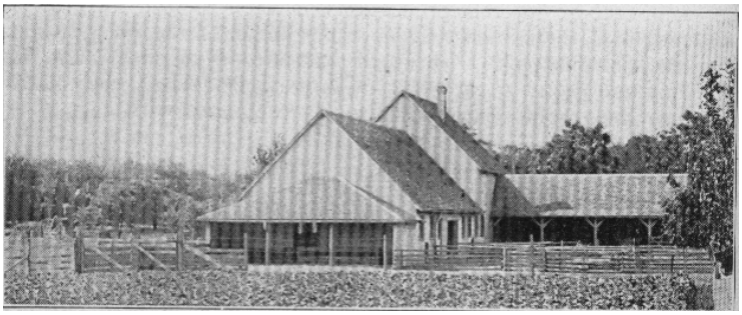


Fig. 13. View of sheep barn showing large open shed for ewes and lambs in winter; also rape pasture for summer forage.

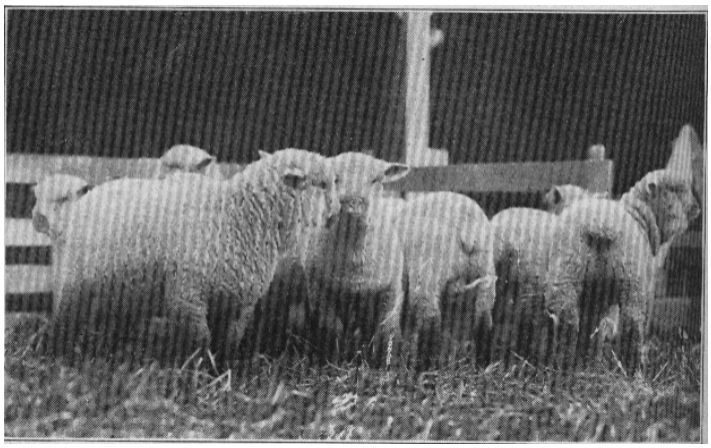


Fig. 14. Fall lambs fed silage

EXTENSION

The dissemination of information obtained by experimental investigation is a very important phase of the work of this Department. The work along this line for some years has consisted of—

Addresses given before farmers' institutes, meetings of feeders and breeders; lectures and demonstrations given before farmers in connection with the district short courses held in the state; exhibits at state and county fairs and the International Livestock Show showing results of work at the Station; cooperative work with farmers and feeders, visits of inspection in various parts of the state in order to obtain information as to problems and conditions confronting feeders and offer suggestions when solicited as to methods of feeding and management of stock; replies to large numbers of inquiries sent in to the Department from Indiana farmers.

Cooperative Work.—The Department has been cooperating with progressive feeders who are in position to keep records of feed consumed, gains, etc., for several years and is anxious to extend this cooperative work, under suitable conditions, among such cattle, swine, and sheep feeders as are prepared to take up the work and keep records of their operations. Such cooperation is not only mutually beneficial to the farmer and the Experiment Station but helpful to the community in which such cooperative work is in progress.

The Station men are sent out to study the conditions on the farms and those wishing to cooperate, obtain information and organize cooperative experiments, weigh and note condition of the stock, feeds, etc., and make suggestions as to feeding and management, when they are desired.

Anyone wishing to take up such cooperative work should write the Department in regard to it.

The Department has also cooperated with the Cattle Feeders' Association in arranging for meetings twice a year in May and November at the University to which farmers and feeders are invited. At these meeting the experimental cattle are inspected and talks given by men from the Department, farmers who are cooperating with the station, and other prominent authorities on cattle feeding. The results of experimental work are usually discussed at the May meeting. Farmers are cordially invited to attend these

Correspondence.—Many inquiries are received by the Department concerning results of feeding experiments with horses, cattle, sheep, and hogs. This is one of the most valuable lines of work carried on and many farmers have taken advantage of this means of securing information from a reliable source. Inquiries from farmers, relating to the selection, feeding, care, and management, the use of various feed such as corn silage, cotton-seed meal, linseed meal, tankage, gluten feed, alfalfa feeds, and forage crops, are invited.

BOTANICAL DEPARTMENT

J. C. Arthur A. G. Johnson Mary A. Fitch
F. D. Kern Thos. Billings Evelyn Allison

The work of the Botanical Department is devoted to the study I of parasitic fungi, especially those forms which are the agents of disease in agricultural crops, to weeds and their eradication, and to wild and cultivated mushrooms. The different lines of work may be considered separately.

Parasitic Plant Diseases.—A record of the distribution and prevalence of the more common fungus diseases of cultivated crops is compiled at the close of each growing season. In this work the Department has the hearty cooperation of a large number of correspondents throughout the state. Much information regarding diseases and their preventives and treatments is sent by letters to correspondents. Observations are made each year on more than 50 kinds of parasitic diseases, 90 per cent. of which are due to fungi such as smuts, rusts and scab.

In the past some notable results have been achieved by the Department in the study of the grain smuts. The formalin method for treating the seed has been further tested and has proved very satisfactory. The process is simple and inexpensive and should be more extensively employed by those who raise wheat and oats.

The seed oats or wheat are sprinkled (See Fig. 15) until thoroughly damp with a solution made by adding one pound of 40 per cent. formalin to 50 gallons of water. They are then shoveled into a pile, (See Fig. 16) covered and allowed to stand for two hours or more, after which they are ready to sow or to be dried and kept for later sowing.

It has also been shown that this formalin method of seed treatment will assist in checking the distribution of other diseases of

The intensive investigation of rusts of all classes of plants is still being continued. The systematic study of these minute and variable organisms is one of the most difficult known to botanical science. The rust problems are of universal importance and it is expected that the issue of a standard work of reference, such as is in preparation by this Department, will elicit and make possible the cooperation of investigators in other states which will ultimately lead to the solutions of some practical problems. Extended studies of these rust parasites are carried on each year in the greenhouses and some notable advances have been achieved by these studies.

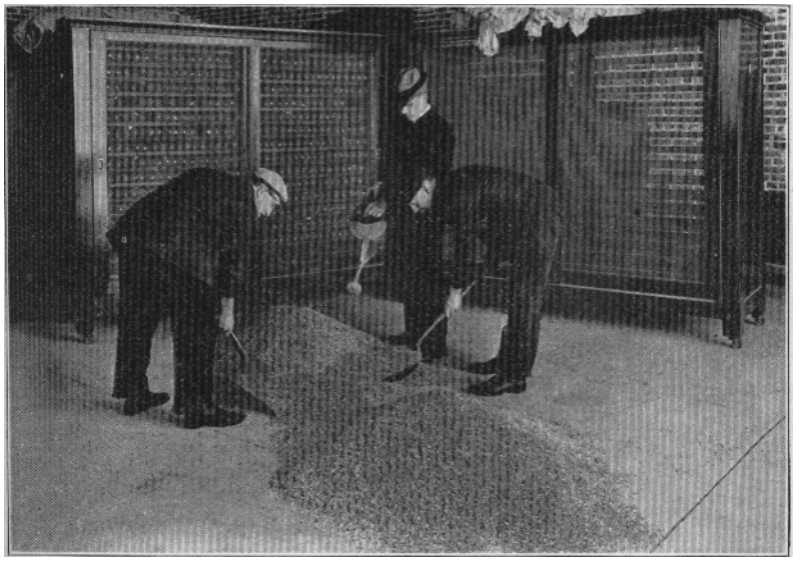


Fig. 15. Application of the formalin solution with an ordinary sprinkling can while grain is being shoveled over

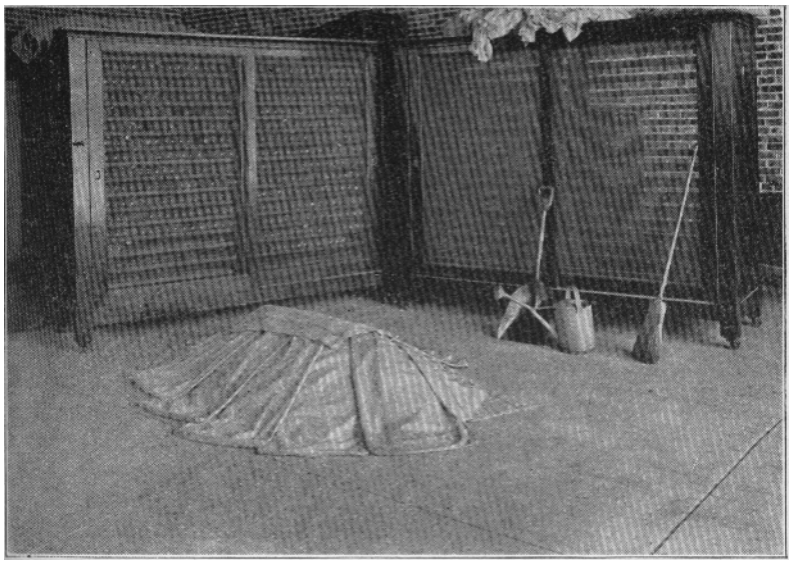


Fig. 16. Pile of grain covered; to be left thus at least two hours

Weeds.—Much attention of the Department is devoted to the study of the introduction, dissemination and destruction of weeds in the state. Many specimens of plants and weeds are received each season for identification and much information concerning means of extermination is furnished through the replies to the correspondents.

Fig. 17. A plate of tan colored mushrooms; a common edible variety often found in dense clusters at the base of living trees. These are ready to cook

Mushrooms.- Many inquires are received each year concerning the wholesomeness of wild mushrooms and regarding the methods of cultivation. This Department is doing what it can to assist people of the state in recognizing the more common edible forms so that they may make use of them as articles of food.

CHEMICAL DEPARTMENT

ARTHUR GOSS S.D. CONNER J.B. ABBOTT

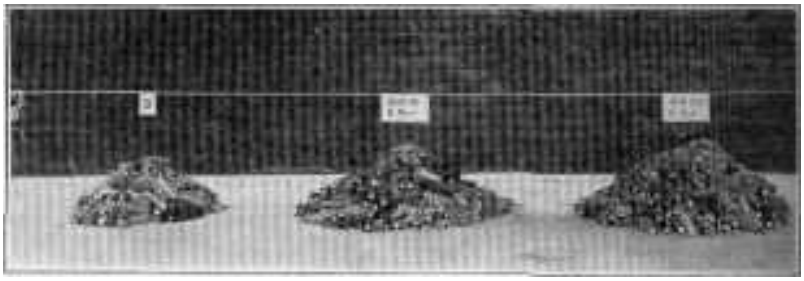
The principal work of this Department at the present time is along the line of soil improvement. A large number of experiments with fertilizers and manure are carried on in different parts of the state on various crops and types of soil each year. The crops which have been experimented with are corn, wheat, oats, clover, timothy, potatoes, onions, tomatoes, and other vegetables and fruits. Tests have been carried to successful conclusion on all the principal soil types in Indiana. As a result of these field tests, the Station is able to suggest the fertilizer treatment required by the various crops and soils of the state. The Station does not make a practice of analyzing soil samples to determine the fertilizer requirements, as there are no chemical methods known that will accurately determine the amount of available plant food in the soil under the varying crop and climatic conditions. It is found best to use the experience obtained in the actual field test in advising methods of treating the soil. Each soil type must be studied by itself. What may be good for one soil may be of no value for another soil. One soil may need one element, another soil may need another element, while still another may need all of the fertilizer elements. Farmers wishing information concerning the fertilizer needs of their soil, should write to the Experiment Station giving a description of the type of soil, the kind of treatment it has had, the system of cropping proposed, together with any other information bearing on a particular case. The Station will then be able to advise them intelligently.

In the following illustrations are shown some of the results secured in the soil improvement work of the Station.

Bushels per acre, 15 Bushels per acre, 49 Bushels per acre, 10

Fig. 18. Experiment showing element principally needed on "bogus" soil, Jasper county

Although phosphorus when used alone or in combination with nitrogen alone, is of no benefit on this type of soil, it is nearly al-ways found to be of benefit when used as an addition to potash. In such cases the plats having phosphorus and potash always mature sooner than where potash alone is used.



Bushels per acre, 15 Bushels per acre, 27 Bushels per acre, 37

Fig. 19. Experiment showing effect of using different amounts of potash on "bogus" soil, Jasper county

As the above illustration shows, it pays to use a good sized application of potash on this type of soil. It is almost invariably the case that the second 100 pounds of muriate of potash pay large returns. As potash remains in the soil until used, there will be large returns from the following crops as well as from the first.

Fig. 20

In Fig. 20 is shown the effect of the use of potash on black sand, sometimes called "bogus" soil in Jasper county. This is a typical test for many of the soils of that region, although it should not be understood that all soils of even this county would require exactly the same fertilizer treatment.

DAIRY HUSBANDRY DEPARTMENT

H.C. MILLS
P. ROBERTS

O.F. HUNZIKER
O.E. REED
W.R. WRIGHT

GEORGE SPITZER
W.F. EPPLE

PURPOSE OF THE DEPARTMENT

To furnish information to milk producers on the economic production of sanitary milk; to assist the manufacturer of butter, cheese, ice cream and condensed milk in successfully turning out a high quality of dairy product.

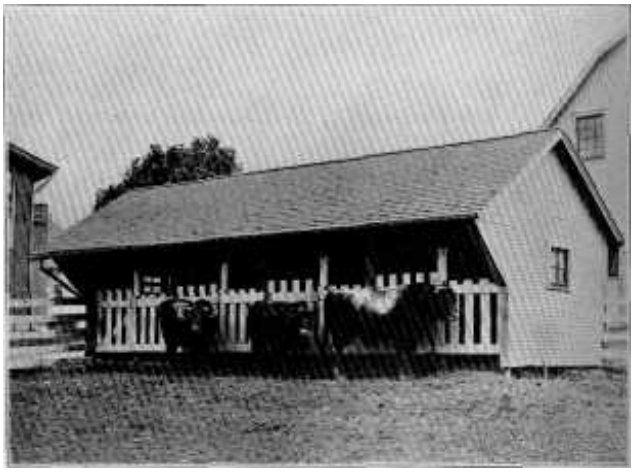


Fig. 21. Comfortable and suitable quarters for the dairy sire

PLAN OF WORK

The work of this Department is divided into

1. Field work,
2. Experimental work.

FIELD WORK

SPECIAL DAIRY MEETINGS AND INSTITUTES are conducted in all sections of the state throughout the year. Instruction is given to the dairy farmer on the selection and breeding of dairy cows; grading up, feeding, care and management of the dairy herd; care and handling of milk and cream; care and operation of the farm separator and the Babcock test; farm butter making; organization of cooperative creameries; and establishment of markets for dairy products.

Send for Circular No.11 on "The Improvement of the Dairy Herd," Circular No. 13 on "Feeding of Dairy Cattle," Circular No. 20 on "Economic and Sanitary Milk Production."

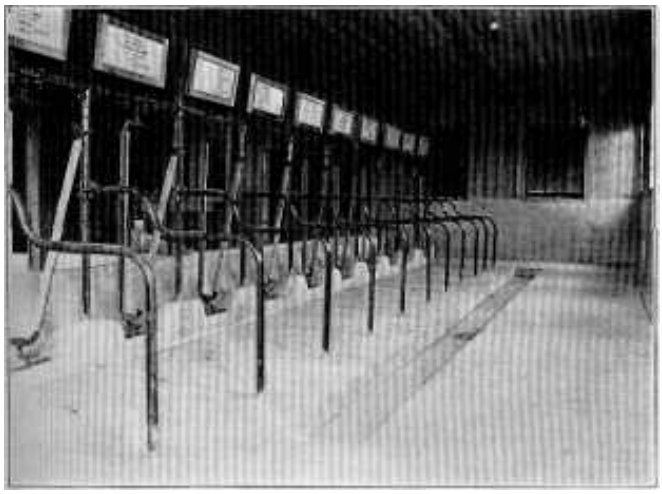


Fig. 22. Interior of Purdue dairy barn

Visits to Dairy Farms and Creameries.—These visits make it possible for the dairyman and factoryman to receive personal advice and assistance for the solution of their local problems. In communities contemplating the establishment of cooperative creameries, the advisability of the installment of such creameries is carefully investigated and specifications for suitable buildings and equipment are furnished by the Department.

Butter-makers receive assistance in the operation of their plants, in making the proper over-run, and in the manufacture of a

high quality of butter which conforms in composition with the laws of the United States Internal Revenue Department.

EDUCATIONAL BUTTER SCORING CONTESTS are held bi-monthly for the purpose of educating farm and factory butter-makers in the demands of the market. The butter is scored by a Government Butter Expert and the scores and criticisms are forwarded at the conclusion of each contest to the respective butter-makers. These contests are splendid opportunities for the progressive butter-maker to perfect himself in his business without expense. Every butter-maker in the state should take advantage of these contests.

Special Dairy Trains.—Whenever opportunity presents itself, special dairy trains are operated. Their purpose is, by means of talks and cow demonstrations, to stimulate interest in the economic and profitable husbandry of the dairy cow.

Fig. 23. A profitable herd of dairy cows The Purdue dairy barn

DAIRY INVESTIGATIONS

COOPERATIVE HERD TEST EXPERIMENTS are conducted with all Indiana dairymen desiring to know the annual production of milk and butter fat of their cows. Sample bottles, dippers, etc., are furnished free of charge for this work. Over 300 annual records of Indiana dairy cows have been made by the Department. The only possible way of making a herd profitable is to know the individual production of each cow. This can be done by weighing and testing the milk regularly, and then weeding out the poor cows and breeding the profitable ones to pure blood sires. Send for Bulletin No. 127.

OFFICAL COW TESTS are made by representatives of the Department for any Indiana breeder of dairy stock, who desires to have his animals try for entry in the Advanced Registry or in the Register of Merit.

Cream Testing Experiments.—An extended experimental study was made of the conditions controlling the accuracy of the cream test. It embraced such factors as accuracy and style of test bottle, method of calibration, method of sampling cream, care and preparation of the sample, details of the test, and methods of reading the test. The results of these investigations should be of special interest to the dairy farmer as well as to the creamery, for he depends on the cream test for the returns from his cream. Write for Bulletin No. 145.

Moisture Control of Butter.—Experiments have been in operation since 1907, and the work is nearing completion. Information and specific instruction that will enable the buttermaker to control the per cent. of moisture in his butter will be of inestimable value to the dairy interests of the state and country.

Fig. 24. The use of a water bath is indispensable for accurate cream tests

Condensed Milk Standards.—Investigations concerning condensed milk standards have been conducted since 1908. They are now complete and the results are published in Bulletin No. 143. This bulletin also contains a copy of the Federal Food and Drugs Act and information concerning the Interstate Commerce Law.

Testing Ice Cream and Sweetened Condensed Milk for Butterfat.—The rigid enforcement of the Federal Pure Food and Drugs Act makes necessary a rapid, practical and accurate method for determining the per cent. of fat contained in these dairy products.

Fig. 25. A good type of inexpensive milk house

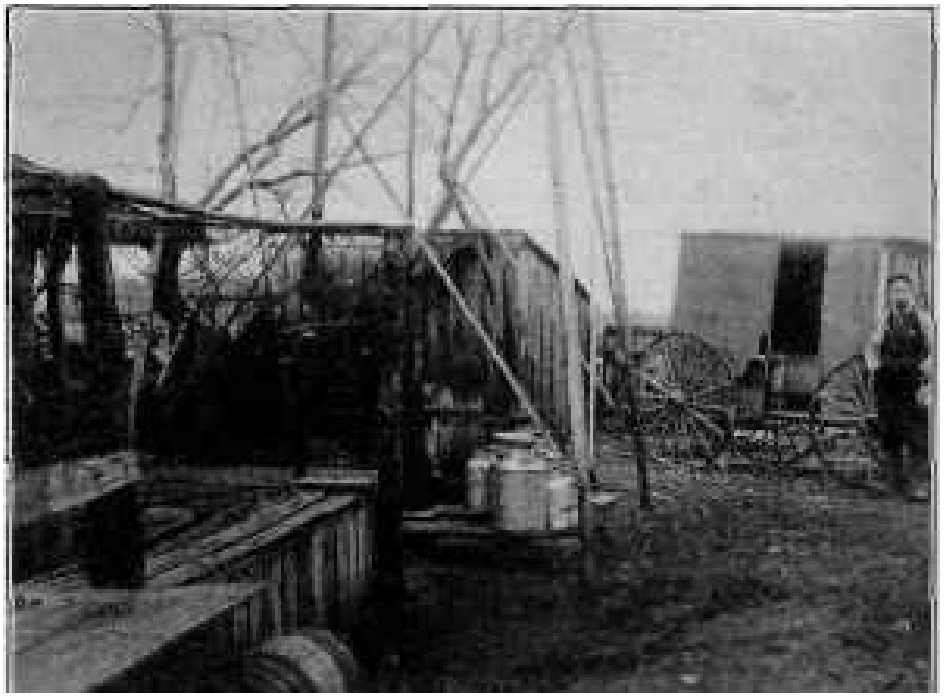


Fig. 26. A poor type of milk house

HORTICULTURAL DEPARTMENT

J. Troop C. G. Woodbury
J. W. Wellington M. W. Richards J. G. Boyle

PURPOSE

It is the purpose of the Department of Horticulture to give assistance and advice to every fruit grower in the state who desires it, and to help each community and individual so far as possible to work out their own peculiar horticultural problems.

Owing to the special appropriation made for horticultural work by the last Legislature, the Department has been able to considerably widen its field of activity and usefulness to the people of the state.

LINES OF WORK

San Jose Scale.—The control of the San Jose scale is one of the most serious problems confronting the fruit growers of the state. For several years the Department has carried on field tests of a number of different remedies for this pest to determine what material was of the greatest value to the practical orchardist. The results of this work are summarized in Bulletin No. 138 and indicate that the lime-sulphur wash is the best and cheapest all round spray for San Jose scale. Some of the commercial brands of ready made lime-sulphur were tested and compared very favorably with the homemade material. Some of the oil sprays do efficient work, and while pleasanter to handle than lime-sulphur, are not as a class so safe nor so efficient.

THE FARMER'S ORCHARD

Much attention is being given to the saving of the home orchards of our state. These small old orchards which are so abundant in the longer settled portions of the state are certainly doomed to destruction unless speedy measures are taken for their protection. As a rule they are unpruned, uncultivated and unsprayed, and consequently unsightly and unprofitable. Many of them may be saved and made a source of profit and pleasure by intelligent care.

Circular No. 17, "The Farmer's Orchard" gives full directions for the laying out, care and management of the home orchard and discusses the problems of selection of varieties, pruning, setting, cultivation, etc., with especial reference to the general farmer. Treatments are outlined also for renovating and caring for old and neglected orchards.

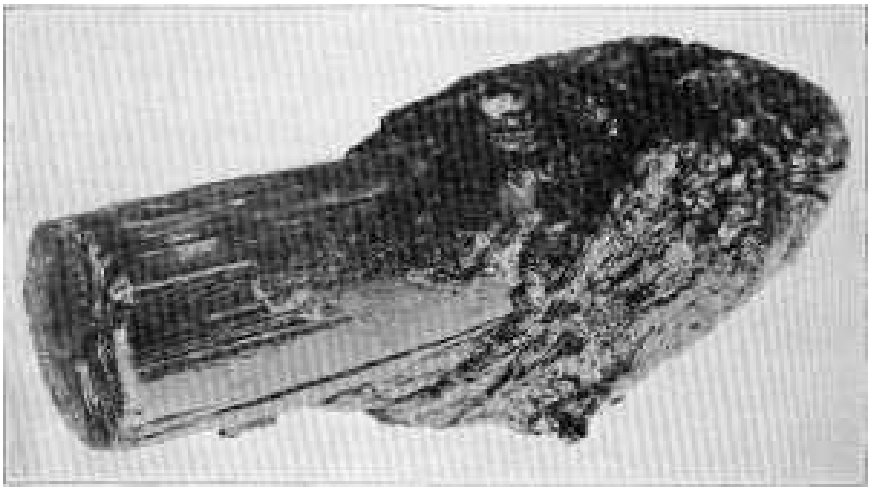


Fig. 27. An example of thoroughly bad pruning. The cut was not started on the under side, hence the limb splintered badly. The stub was left too long and could never heal (From Cirular No. 17)

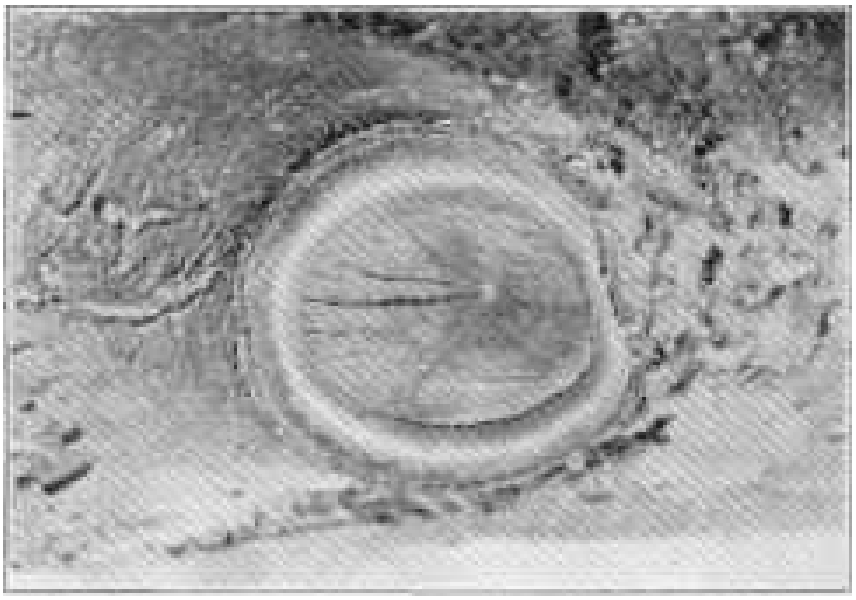


Fig. 28. This wound was properly made and is staring to heal nicely. A good coat of paint should protect the wood until covered with the callous (From Circular No. 17)

Circular No. 21. "Spraying the Orchard" is supplementary to Circular No. 17, and takes up the common spraying problems which must be understood and indicates the spraying practices which must be observed if the tree fruits are to be saved from the attacks of insects and diseases.

Demonstration Meetings.—In order to carry the practical information which is necessary to successful fruit growing, to the people who are most directly interested, a large number of

Fig. 29. San Jose scale only slightly enlarged covering the bark of an apple twig. The scale is seen by the naked eye simply as a grayish of nearly black scurfy coating and often appearing as if ashes had been sifted on the infested limb (From Bulletin No. 135)

demonstration meetings has been held. These meetings take place in the open air in orchards selected for the purpose and talks are given on pruning, spraying and orchard management. Tools and spray pumps are at hand and the points brought out are illustrated by practical operations on the trees. Local conditions and practices are discussed and criticised and questions on orchard topics heard and discussed. The Department expects to continue this line of work during 1910 and full particulars will be forwarded on application, outlining the conditions under which a meeting may be secured by an interested community.

Tomatoes as a Farm Crop.—Investigations have been carried on for three years in regard to methods of growing tomatoes as a field crop for the canning factory. Indiana is in the front rank in the extent of the canning industry and about 30,000 acres are annually devoted to tomato growing. Bulletin No. 144 summarizes the studies that have been made along this line and gives directions for growing the plants, setting, cultivating, fertilizing, etc. Some of the problems brought out by the investigations are receiving further experimental study and will be reported upon later.

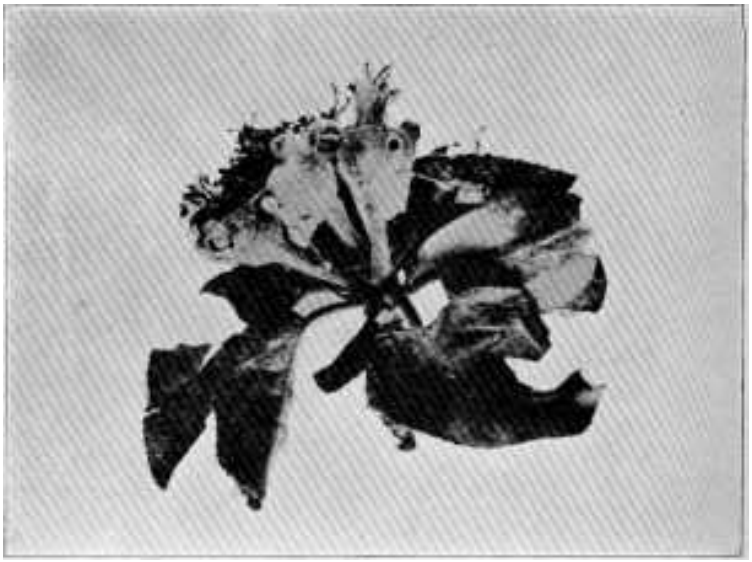


Fig. 30. Just after the petals fall and before the calyx lobes close up, is the stage of bloom at which the most important spraying for coding moth should be done (From Circular No. 17)

Cantaloup Improvement.—Spraying experiments on a commercial scale have been carried on with regard to the control of rust on cantaloups by spraying with Bordeaux mixture. It has been shown that this disease, which annually causes large loss to the cantaloup growers, can be held in check, and that spraying is profitable. Bulletins Nos. 123 and 135 bear upon the problems connected with melon growing and report the experiments which have been

Studies of Catalpa and Locust Growing.- Extensive field studies have been made in many parts of the state to determine the best method of growing catlpa and locust for post and pole production and the profits which may reasonably be expected therefrom. This information will soon be available in printed form. In the meantime the Department will be glad to advise prospective planters through correspondence.

IMPROVEMENT OF INDIANA PECANS.- Indiana possesses an undeveloped horticultural resource of great economic importance in the native pecans of the lower Wabash and Ohio river valleys. The

Fig. 31. At this stage, just before the flower buds open, spray with Bordeaux mixture to control the scab fungus

Department is endeavoring to locate and save the best native varieties and eventually hopes to propagate them to a sufficient degree to ensure their preservation. Many valuable sorts have been found already, which compare very favorably with the best named varieties of southern origin. Specimens of native nuts are solicited and advice will be gladly given in regard to the commercial possibilities of the business in Indiana.

STATE CHEMIST DEPARTMENT

W. J. JONES, Jr.	E. G. Proulx	C. W. RICE
F. D. Fuller	C. Cutler	S. P. Armsby

The official work of this Department consists in the administration of the laws regulating the sale of commercial fertilizers and concentrated commercial feeding stuffs in the state of Indiana and the settlement of disputes between coal oil dealers and inspectors. In view of the fact that the estimated value of the combined sales of fertilizers and feeding stuffs in Indiana during the past year reached a total of approximately $5,000,000, the importance of this work to the farmers of the state cannot be over-estimated.

The first fertilizer law in Indiana was passed in 1881 but as it provided only for the analysis of manufacturers' samples it was wisely amended by the legislatures of 1899 and 1901 to permit of the analysis of samples taken from consignments actually offered for sale in the state, thereby affording the protection to consumers which was desired.

Since the amended law became effective this Department has collected from all parts of the state 8403 samples with the result that while of 481 samples secured in 1899 and 1900, 322 or 67 per cent. were so much different from the guarantee as to seriously deceive the purchaser, of 969 samples analyzed in 1909 only 34 or 3.5 per cent. failed to be within 10 per cent. of the guaranteed value and only 138 or 14 per cent. showed a deficiency in any ingredient of 20 per cent.

When it is remembered that the amount of fertilizer sold in Indiana in 1909 was approximately 134,063.7 tons, an increase of 33 1/3 per cent. in the past 10 years, representing an expenditure of approximately $3,000,000 on the part of the farmers of this state, the importance of the Fertilizer Control Law becomes apparent.

FEEDING STUFF CONTROL LAW

This law was passed by the legislature of 1907 in compliance with the demands of the farmers and feeders of the state for protection against the large amount of adulterated and inferior feeding stuffs then known to be sold in the open markets of Indiana. At that time most of the states, and especially those surrounding

Indiana had feeding stuff laws and it was evident that this state was serving as the dumping ground for low grade material that could not be sold elsewhere. Some law, therefore, regulating the sale of feeding stuffs in Indiana was absolutely necessary.

The Act as formulated was just and one that has met with the various requirements of such a measure as well as any that could be devised. It gives the farmers and feeders the protection they have a right to expect and has placed the traffic in feeding stuffs upon a strict business basis by making it possible for every one to know what he is buying and selling.

Briefly stated the objects of the law are as follows:

1. To have all feeds offered or exposed for sale or sold in the state labelled so that the consumer may have information as to their composition and the materials used in their manufacture.

2. To protect the consumer against adulterated or inferior feeds which up to the time of the passage of the law he had no means of recognizing.

3. To protect the honest manufacturer and dealer against dishonest competition.

4. To inform the consumer as to feeds which are the most economical to purchase and to promote the rational use of feeding stuffs.

The inspection of the past three years gives ample evidence that the law is accomplishing the purpose for which it was enacted. The microscopical and chemical analyses of nearly 4200 samples show that the use of the ordinary adulterants such as corn-cob meal, oat hulls, corn bran, screenings, sweepings, cotton-seed hulls, etc., have been practically eliminated and that the feeding stuffs offered for sale in this state are sold on their merits and for what they are, and not through misrepresentation regarding the raw material used in their manufacture.

It is gratifying to note that consumers are expressing a desire to investigate the feeding stuffs offered for sale and to purchase those needed to supplement the material grown on the farm. The sale of a large number of inferior feeding stuffs has been greatly reduced and in many instances such feeds have been entirely withdrawn from the Indiana markets, resulting in great benefit to the consumer and to the manufacturer of honest feeding material.

Since the enactment of the law to January 1, 1910, 15 violations have been adjusted. Many of these violations resulted from selling feed in packages which did not bear the State Chemist's tag showing the analysis and composition of the goods. In one instance in

particular, four and one-half tons of alleged cotton-seed meal were shipped without tags from Muncie to Farmland. On inspection this shipment was found to be cotton-seed feed meal containing approximately 55 per cent. cotton-seed hulls. The evidence in this case was presented to the grand jury and a true bill found. Settlement was made by the vender paying the purchaser $50.00 rebate due to difference in composition of material furnished and the cotton-seed meal contracted for. It is estimated that there were over 1700 tons of cotton-seed meal sold in Indiana in 1909.

Information received by this Department leads us to believe that prior to the passage of the Feeding Stuff Law a large percentage of the cotton-seed meal delivered in this state was mixed with cotton-seed hulls. If, and there is good evidence to indicate that such was the case, three-fourths of the cotton-seed meal sold was adulterated as in the case mentioned, the Feeding Stuff Law during the past year has protected the farmers of Indiana in the use of this one commodity alone to the extent of $14,163.75. Inasmuch as this Department receives a fee of 16 cents per ton to cover the expenses incurred in registering, inspecting and analyzing feeding stuffs and supplying stamps or labels for their sale, the saving of over $14,000 to the farmers of Indiana in the sale of cotton-seed meal alone during the past year would pay the cost of inspecting 88,524 tons of feeding stuff.

ADMINISTRATION

The laws are administered by the State Chemist and his deputies and the official business of the Department is limited to the inspection of fertilizer and feeding stuffs and the settlement of disputes between coal oil dealers and inspectors. The only funds available for carrying on the work of the Department are those received from the sale of tags and the revenue will not permit of the analysis of miscellaneous samples of water, soil, rocks, etc. Information regarding fertilizers, feeding stuffs and related subjects will be promptly furnished but the analysis of samples must be restricted to those taken by the State Chemist's deputies. These deputies are on the road throughout the year taking samples of fertilizers and feeding stuffs from goods on the market in all parts of the state.

Consumers of fertilizers and feeding stuffs are cautioned not to accept any package of either which does not have attached the State Chemist's tag bearing the minimum guarantee and other facts required by law and countersigned with his official signature.

In purchasing fertilizers, examine the State Chemist's fertilizer 4 bulletin and purchase only of companies whose inspection results

show they are maintaining their guarantees and furnishing the amounts of fertilizing ingredients guaranteed.

In purchasing feeds, examine not only the guarantee of crude fat and crude protein but also the list of ingredients used in their manufacture.

If inspections are desired notify the State Chemist of the amount to be inspected and the official number of the fertilizer or feed and if the shipment justifies an inspection, an inspector will be sent to secure a sample without cost to the consumer.

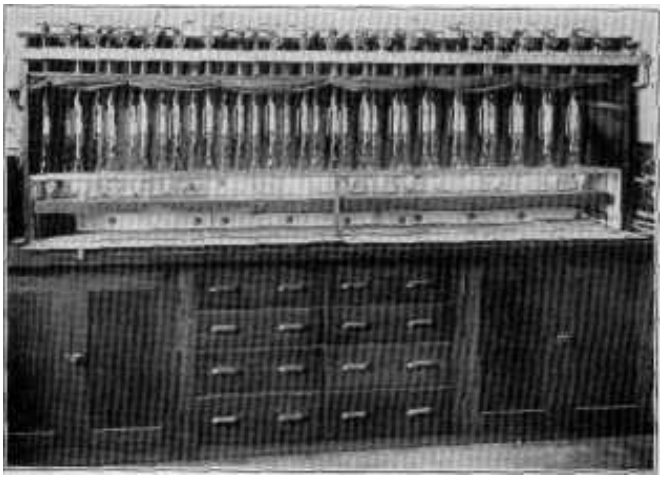


Fig. 32. Apparatus used in the State Chemist's laboratory for determining fat

The results of the inspection of fertilizers and feeding stuffs for the year 1909 will be found in Bulletins No. 148 and No. 141. Those interested in the purchase of fertilizers are advised to consult Bulletin No. 148 and those desiring information regarding the feeding stuffs sold in Indiana are referred to Bulletin No. 141. Copies of either of these bulletins can be secured free of charge by applying to the Director of the Experiment Station.

VETERINARY DEPARTMENT

R. A. CRAIG H. H. Madaus

HOG CHOLERA

Hog cholera exists in all sections of the United States, but it is especially prevalent in the middle west. In this section of the country it may be considered of greater economic importance than any of the other animal diseases. In our own state, the average yearly loss is about $3,000,000. It is difficult to make an exact estimate of the loss to the swine industry from this disease, as the statistics giving the death rate in swine include all diseases, but it is fair to assume that the greater portion is due to hog cholera. We should also include with the loss resulting from the high fatality, that resulting from the marketing of young hogs in neighborhoods where the disease is prevalent. This frequently amounts to 50 per cent. of the herd's value.

The Veterinary Department receives a large number of inquiries every year regarding the prevention and treatment of hog cholera. Bulletin No. 140 has been prepared for the purpose of informing farmers as to the investigation work of the past few years and methods of controlling the disease. Great interest has been shown in the Dorset-Niles hog cholera serum. The Department is producing and distributing this serum.

In ordering serum, the owner must state the condition, number and weight of the animals in the herd. Serum will not be furnished for the treatment of badly infected herds. For the present and until the method of vaccinating hogs is better understood by stockmen, serum will not be sent direct to them. So far as possible, a field man from the Department will visit and vaccinate or treat the herd. Serum may be secured through the local veterinarian and administered by him without extra charge to the owner.

Fig. 33. Map showing per cent. of disease in hogs in different counties of state

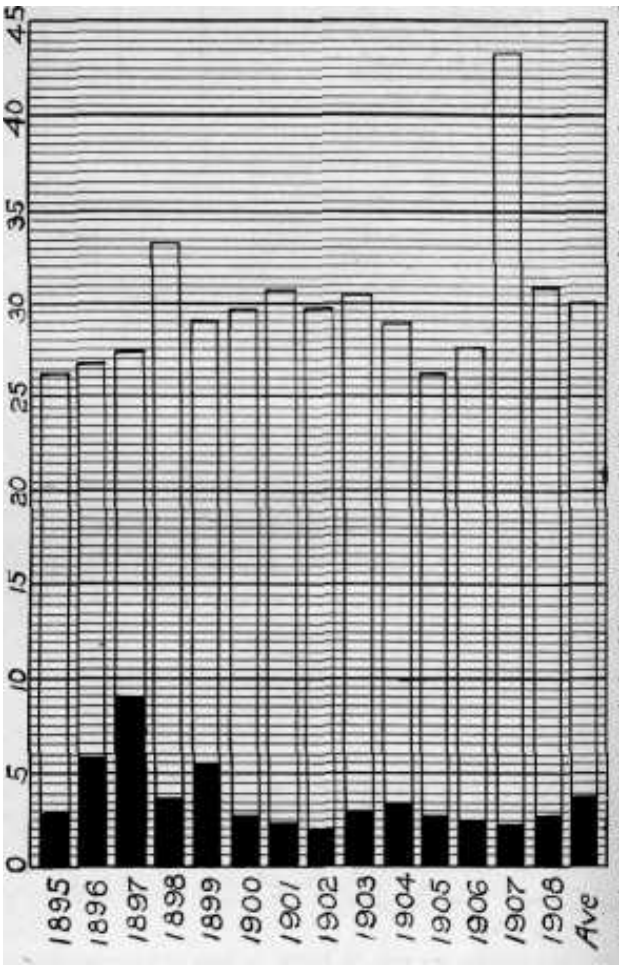


Fig. 34. Number of hogs raised and lost from disease in this state annually and the average for a period of 14 years. Blackened portions show number lost. Each heavy cross line represents 50,000 each

SCHOOL OF AGRICULTURE

John H. Skinner, Dean

PURPOSE

The purpose of this school is to inspire a love for country life and give young men and women a broad, well rounded education; to educate them for the business of (arming and other important positions requiring agricultural training. This is accomplished through a study of the many subjects covering the various phases of the great field of Agriculture, and the fundamental sciences, Biology, Chemistry, Physics, Mathematics, English and History. A large number of courses are prepared to meet the needs of farmers' sons and daughters. Those with limited means and preparation have been provided for as well as others.

INSTRUCTION

The instruction in Agriculture is practical and thorough, consisting of recitations, lectures and laboratory work in which agricultural science and practice are systematically taught. The student deals with the common every day problems of the farm, works with soil, plants, live stock, fertilizers, and dairy products, and is constantly working with the things with which he comes in contact on the farm. Agricultural students analyze soils, study crop rotations and production, judge grains, handle and judge live stock, study selection, feeding, breeding, production and care of live stock, practice grafting, budding, and pruning, judge fruits and vegetables, study the life history, characteristics and habits of insects and fungi and methods of preventing their ravages, make up mixtures for spraying, test grains and other seeds, adjust and operate farm machinery, separate and test milk, make butter and cheese, and study the production and care of dairy products, and thus secure practical knowledge of these various farm products and operations.

The School of Agriculture consists of five distinct departments, viz., Agricultural Extension, Agronomy, Animal Husbandry, Dairying, and Horticulture, to which a large corps of instructors devotes its time.

AGRICULTURAL EXTENSION

Professor Christie in Charge

The work of this Department comprises all those forms of agricultural instruction that aim to reach people on the farm and in the public schools. The Department attempts to place before these people the teachings of the School of Agriculture and Experiment Station. It also attempts to interest the young people of the farm and schools in agricultural studies and to impress upon them the importance and value of an agricultural education.

This work is accomplished through district short courses (which consist of practical instruction in agricultural subjects occupying a full week and given at a central place in the various congressional districts of the state), industrial clubs and contests, special educational trains, exhibits at county and state fairs, county farm tests, special literature, excursions from the various counties of the state to the University, and lectures before teachers' institutes, Chautauquas, farmers' institutes and other organizations.

AGRONOMY

Professor Wiancko in Charge

Professor Latta, Associate Professor Fisher, Assistant Professor Nye (Agricultural Engineering), Instructor Conner (Agricultural' Chemistry), Assistants C. E. Craig, L. S. Mills

The courses of instruction in this Department are designed to give students a knowledge of the principles involved and the best practices followed in crop production and farm management, including detailed classroom and laboratory studies of all kinds of farm crops, their characteristics, culture and uses, the selection, preservation and testing of seeds, corn and other grain judging, systems of cropping and methods of crop improvement; the physical characteristics of various types of soils, systems and methods of tillage; the chemistry of soils and crops, the value and uses of manures and fertilizers, soil improvement and the maintenance of fertility; land drainage, the location and construction of drainage systems; the planning of farm buildings, the uses of cement on the farm, fencing materials and fence construction; the operation and care of all kinds of farm machinery; farm economics and the practical business of farm management and profitable production; the relation of theory, experimentation, science and practice in the advancement of agriculture.

Fig. 35. Studying weed seeds

Fig. 36. Studying the gasoline engine

ANIMAL HUSBANDRY

Professor Skinner in Charge

Professor Craig (Veterinary Science), Assistant Professor Smith, Instructors Arnett, Crane (Poultry)

The instruction in this Department is intended to give students a knowledge of the importance, and value of the live stock industry, the various classes and breeds of live stock, and to inspire a love for live stock farming. Instruction is given in the history and char-

Fig. 37. Students judging fat cattle

acteristics of breeds, the principles of breeding, animal nutrition and feeding, care and management, veterinary anatomy and physiology, veterinary medicine and surgery, and the production, fitting and marketing of horses, cattle, sheep, swine and poultry. Much time is given to practice in scoring, judging and selecting the various classes and types of animals for breeding and feeding purposes and to the tabulation and study of pedigrees, methods of registering, blood lines and family characteristics.

Fig. 38. Class judging Shropshire sheep

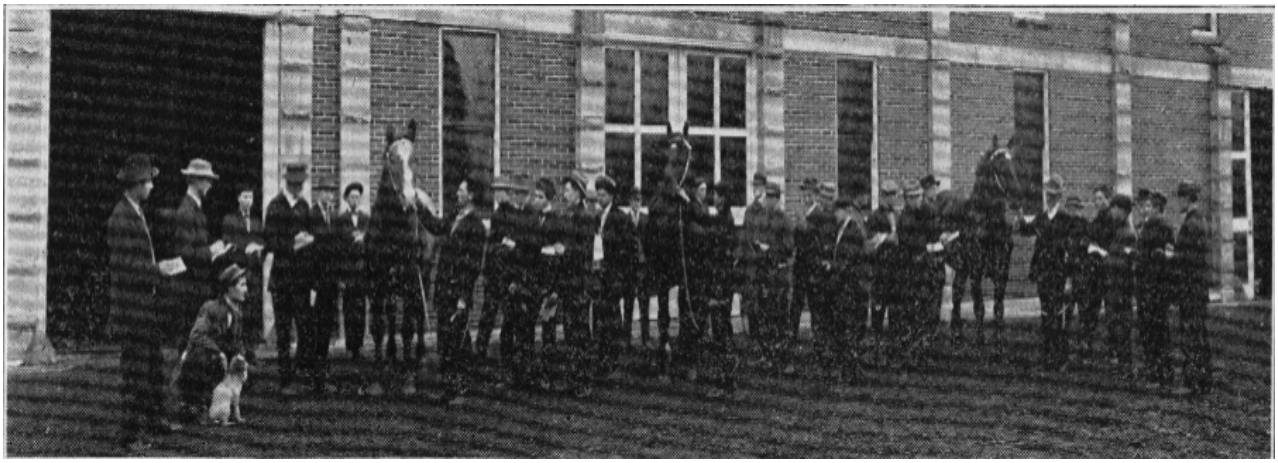


Fig. 29. Class judging draft horses at Lafayette Stock Farm

DAIRY HUSBANDRY

Professor Hunziker in Charge
Instructors Jarvis, Reed

The instruction in this Department deals with the dairy cow and her product. It is intended to train the student in the knowledge and practice of economic and sanitary milk production (how to select, breed and feed dairy stock for profit) ; the care and management of the dairy herd; judging dairy cattle; the secretion, composition, properties and ferments of milk; city milk supply; farm and

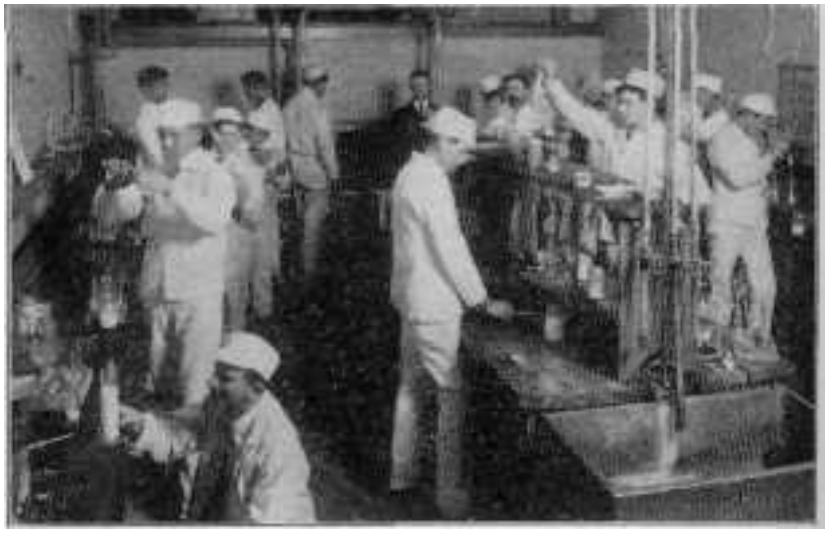


Fig. 40. Students testing milk

Fig. 41. Judging dairy cows at School of Agriculture

creamery buttermaking; creamery management, accounting and machinery; cheese making; the manufacture of condensed milk, ice cream, fermented milks, dried casein and miscellaneous products; testing milk and its products for purity and composition; state and federal dairy laws and milk and dairy inspection.

HORTICULTURE

Professor Troop in Charge
Instructor Boyle

The instruction in this Department is designed both from the standpoint of the commercial and the home grower of fruits and vegetables. It covers the field of pomology in which the principles involved in growing tree and small fruits are considered with respect to their propagation, selection, setting, pruning, training, thinning, spraying, classification, identification, harvesting, storing, and marketing ; vegetable gardening as regards the selection of varieties, suc-

Fig. 42. Students receiving instructions in pruning

cession of crops, fertilizing, control of insects and fungus diseases, and the construction and management of cold-frames and hotbeds; landscape gardening as applied to the decoration of home grounds and small parks with regard to the selection, propagation, setting, and pruning of ornamental trees, shrubs and vines, establishing and renewing lawns, etc.; greenhouse management, taking up types of glass houses and forcing structures, methods of construction, heating and ventilation, and a study of the principal vegetable and floricultural crops.

Fig. 43. Laboratory practice in greenhouse work

UNIVERSITY CALENDAR

Fall entrance examinations begin September 6,1911
The Four Year Course will begin September 13,1911
The Farmers' Short Course will be held early in January, 1912
The Winter School of Agriculture will open in January, 1912