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The Iowa State College of
Agriculture and Mechanic Arts
Official Publication

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HOW
IOWA STATE COLLEGE
SERVES IOWA

*Scientific education is
an essential condition
of industrial progress.*
---Huxley

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The paper on which these words are printed is a product of Iowa's cornfields. By processes worked out at Iowa State College, it is now possible to manufacture many grades of paper from cornstalks and other agricultural wastes. The sheet of cornstalk paper on which this booklet is printed, is an example of one of the services that Iowa State College has rendered to the state.

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HOW THE IOWA FARMER'S TAX DOLLAR IS SPENT

The typical tax expenditure of an Iowa farmer who owns 165.6 acres of land is given below. These figures represent the average taxes (levied in 1931 and payable in 1932) of 1,580 farmers from 1,580 townships in 99 counties and were secured and summarized by the Extension Service of Iowa State College.

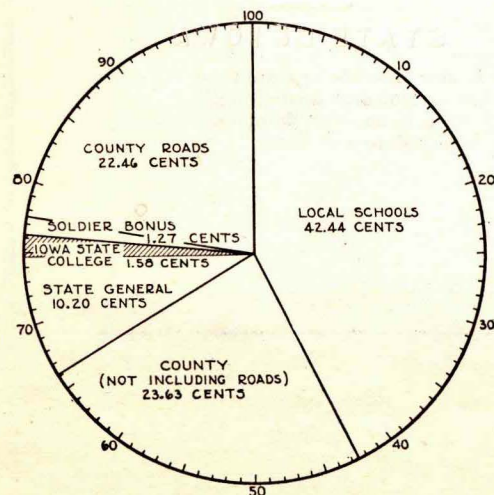
Average of 1,580 Iowa Farms

Total taxable valuation (including real estate and personal property)	\$2,876.82
Total mills levied	78.4
Total taxes on farm (including personal property but omitting moneys and credits)	225.54

	Mills levied	Amount of taxes paid		Pct. of all taxes paid
Local Schools	33.27	\$95.72	\$ 95.72	42.44
General County	5.88	16.92		
Poor	2.82	8.11		
County and State Insane	1.52	4.37		
County Schools96	2.76		
County Bonds	3.29	9.46		
Soldiers' Relief33	.95		
Court Expense	1.28	3.68		
County Hospitals20	.57		
T. B. Eradication57	1.63		
Miscellaneous	1.68	4.83		
Total County (not including roads).....			53.28	23.63
County Roads	17.60	50.64	50.64	22.46
Soldiers' Bonus	1.00	2.88	2.88	1.27
*Total General State	8.00		23.02	10.20
Institutions under Board of Control.....		7.65		
General Administration, State Departments		5.52		
Institutions under Board of Education.....		9.85		
Iowa State College including Experiment Station and Extension Services		3.55		1.58
Total for Farm	78.4		\$225.54	100

*Besides the direct tax, the state also receives revenue from various excise taxes and fees, such as the cigarette tax, inheritance tax, insurance tax, office fees, etc. These contribute about one-half to the state general fund.

Further the state collected certain trust funds (automobile license fees, state gasoline tax, fish and game licenses, etc.) which do not go into the State General Fund.



This diagram illustrates graphically the facts presented in the above summary of 1,580 farmers' tax receipts. The shaded portion represents the amount of the farmer's tax dollar that is used for the support of Iowa State College.

How Iowa State College Serves Iowa

These five services which Iowa State College renders to the taxpayers of the state pay many times over the annual cost of the College to Iowa.

Item	Estimated Annual Value of Service
Increases earning capacity of over 700 graduates each year. (Statistics show that college graduates earn about \$1,000 per year more than high school graduates, or a total of \$40,000 during their professional lives after graduation. The "present worth" of this \$40,000 at graduation is about equal to the par value of \$19,800 in U. S. 4% bonds. Deducting \$5,000 for the cost of the education to the student (including his four years' possible earnings if he had not gone to college) leaves \$14,800 as the money value at graduation of his college education.	
Iowa State has averaged for the last 10 years 391 men and 197 women graduates with baccalaureate degrees, 100 men and 36 women graduates with master degrees, 19 men and 1 woman graduates with doctor degrees. After allowing for lesser earnings of women and the fact that master and doctor degrees represent less than four years of college work in addition to the work for the baccalaureate degree, the money value of the college educations of the 744 yearly graduates is not less than 500 x \$14,800)	\$7,400,000

The College Developed Method for Utilizing Iowa Gravels in Concrete Making. (Experimental work conducted by the Engineering Experiment Station developed methods for the utilization of Iowa gravels without waste or expensive handling in the making of concrete. During the past 10 years this work has saved the state \$2,852,000 in highway paving work alone. It has besides made great savings wherever concrete has been used in bridge construction, municipal paving and private construction enterprises. This service alone has paid several times over the entire expense of the Engineering Experiment Station since its establishment in 1904).....\$ 285,200

Saved Watermelon and Onion Industries. (In 1900, on Muscatine Island alone, 8,000 acres were devoted to the production of watermelons. By 1930 watermelon wilt, a fungus disease, had practically wiped out this industry. In response to calls from growers, plant pathologists at Iowa State College developed a strain of wilt-resistant watermelons which makes possible the revival of watermelon growing. Conservative estimates indicate that this work has a potential value, as it affects these 8,000 acres alone, of about \$160,000 a year. About 50,000 additional acres of sandy soil in Muscatine, Louisa and Lee counties are suitable to watermelon culture

Due to work by plant pathologists of the College, yellow dwarf disease of onions, which threatened to wipe out the onion industry of Scott county, was conquered. In this one onion district, this service has been worth an average of \$60,000 a year. In addition the continued growth of onions has maintained the high value of the land, which otherwise would have depreciated to only a fraction of its current worth)\$ 220,000

Develops New Crop Varieties. (Any profit in crop growing must come from the yield above that required to equal the actual cost of production. Under present conditions the "profit bushels" must be secured by efficient production, with maximum yields from fewer cropped acres. The best in available varieties is essential to efficient production. The worth of new varieties from the Iowa Agricultural Experiment Station, even on the basis of current prices—Ames prices on November 7, 1932—is as follows:

1. Over 60 percent of the Iowa oat acreage is planted annually with varieties originated at the Experiment Station, with an average increase in acre yield of 4.5 bushels—a total for the state of 16,200,000, bushels, worth \$1,620,000.
2. Velvet, a new smooth-awned variety of barley from Minnesota, was, through the cooperation of the Experiment Stations, tested and distributed to Iowa farmers, and is now grown on 40 percent of the present barley acreage with an average gain of 2.76 bushels per acre—a total for the state of 300,000 bushels, worth \$51,000.
3. Over one-eighth of the Iowa corn acreage is now planted with new, high-yielding varieties, found, tested and given general distribution since 1921, with an annual gain to Iowa growers of not less than 2,175,000 bushels, worth \$217,500.)\$1,888,500

Develops and Popularizes Self-Feeding of Swine. (The idea, revolutionary at the time, of self-feeding swine, was first developed and tested at Iowa State College. Many tests were carried out by the College to find out the savings that can be effected by self-feeding growing and fattening pigs. It is conservatively estimated that self-feeding is responsible for a saving of at least \$1.00 a pig in production costs. Iowa marketed approximately 13,000,000 hogs last year. At least one-fourth of Iowa's pig crop is self-fed. The saving to Iowa hog producers was therefore well over three million dollars.)\$3,250,000

Total Annual Value of Five Services.....\$13,043,700

The above CREDIT SHEET presents only five out of the many hundreds of services that Iowa State College renders the state. These happen to be services to which it is comparatively easy to apply a money valuation. Many other services, no less important to the well being and progress of the state, cannot be appraised solely in terms of dollars and cents.

In the following pages are grouped together brief statements concerning other services that the College is performing in return for the support which is given it by the state. Even this list is not complete, but represents only the more important phases of the College's work.

How Iowa State College Serves Iowa

Iowa State College Has Trained 11,000 Graduates. The College is first of all a great educational institution. Every year it has in its classes some 6,000 young people, the great majority of them from Iowa.

It has throughout its history—since the first class was graduated in 1872—conferred degrees on 11,000 students. Many more thousands, who have not completed their college courses, have had the benefit of college training.

While it is possible to give an idea of what this training has meant to these young people in dollars and cents, it is wholly impossible to measure the less tangible values of their educations or the values which these trained men and women have brought to the state.

Assisted in Creating New Industries for Iowa. *The Chemical Engineering Department discovered the practicable methods now in use at Cedar Rapids for manufacturing furfural from oat hulls. This department has done the fundamental research required in establishing the manufacture of lumber substitutes from corn-stalks now in use at Dubuque.*

Finds Value of Purebred Dairy Sires. Good purebred dairy sires used for two crosses on the poorest of dairy cows will increase the production of the progeny sufficiently to make them far above the average dairy cow in Iowa. This fact has been clearly demonstrated in an experiment which was conducted by Iowa State College over a period of about 20 years. In this experiment inferior cows with a production of 202 pounds of butterfat per year were bred to purebred dairy sires of four different breeds. The daughters by the purebred sires yielded an average of 75 more pounds of butterfat than their scrub dams. The granddaughters of the scrub cows (by purebred sires) each yielded 171 pounds more butterfat than their scrub granddams. On

this basis, two crosses by good purebred dairy sires on half of the cows kept for milk in Iowa would raise the Iowa yearly farm income 24 million dollars, providing the same improvement took place as in this experiment.

Helps to Improve Quality of Dairy Products. The quality of Iowa dairy products has been constantly emphasized by the College. A State Educational Contest for butter has been conducted for 22 years. Twenty-three years ago there was not sufficient sweet cream available in the state to furnish the manufacturers of ice cream with all they needed, while today we have an abundance of sweet cream and are even demanding, in most of the up-to-date creameries, that sweet cream be furnished for buttermaking. Iowa creamery operators have won six out of the last eleven banners offered by the National Creamery Buttermakers' Association for high quality butter.

Reduces Mortality of Growing Chicks by 27 Percent. A project which has been conducted in cooperation with farmers proved that improved methods of feeding and sanitation developed by the College reduced the mortality of growing chicks by 27 percent. The potential annual value of this project to the state is \$2,025,000.

Interests Thousands in Thrift Demonstrations. *During the past year canning demonstrations were held by the College in every Iowa county, not only for the purpose of teaching personal saving but to provide a method of reducing the cost of county aid for needy people. As a result of the training schools 41,098 different women were trained for leadership. A total of 546 organizations helped with the work; they included city women's clubs, 4-H club committees, garden clubs, ladies' aid societies, teachers,*

Educational Purpose

Iowa State College was established and is supported jointly by the United States and the State of Iowa, for the main purpose of enabling the sons and daughters of farmers and others engaged in Iowa industrial pursuits to obtain within the state and at costs within their reach educations, second to none, of a character to fit them best for the several pursuits and professions of life.

American Legion auxiliaries, Red Cross, parent-teachers' associations, missionary societies, civic clubs and the like. Similar demonstrations are being conducted by the College on Storage of Fruit and Vegetables, Uses of Home-Grown Wool, Uses of Home-Grown Food Products and a Clothes Clinic.

Steers Elevators from Unwise Investment. By reason of a study made in 1927, Iowa State College was able to deter many elevators from making unwise investments in the purchase of equipment to do feed grinding as a sideline.

Conducts Research on the Vitamins in Tomatoes, Sweet Potatoes and Butter. The College is now finding to what extent canned tomatoes lose their vitamin content during storage. The College is also endeavoring to find the extent to which sweet potatoes may be used as a source of vitamin A and whether the cultural methods can increase the vitamin A content. Studies of the relation of butter coloring to the vitamin content of butter, and the amount of vitamin A in winter butters produced in four different sections of Iowa, are also being made.

Fosters Fish and Game Areas. The College fostered and is assisting in the state survey and comprehensive plan of land areas for the state fish and game and the conservation commissions.

Develops Agricultural Leaders. *The College has for many years been attracting as students some of the best farm reared boys in this and other states. If these young men did not have the opportunity to take college training in agriculture most of them would be lost to other*

fields. It is common knowledge that the farm population has supplied industry and the professions with many of their ablest leaders.

Certainly the agricultural industry now needs and will continue to need the best minds it can have, men of ability and men as well trained or better trained than the leaders in other fields. Much is now being said about putting agriculture on a par with other industries. This will be done only when agriculture has leaders able and trained to cope with the leaders of other industries.

Prepares Hundreds of Recipes. In addition to the recipes prepared and recommended to Iowa families, the College prepared and distributed recipes in hundred quantity amounts to owners of restaurants, tea rooms and large boarding groups in the state.

Attacks Creamery Business Problems. Business and organization problems of farmers' cooperative creameries have been studied by the College and it has devised an accounting system which has been widely adopted by many creameries. This work has been the means of revealing and correcting unsound business methods in scores of creameries in Iowa. It has helped to standardize the business and accounting methods of creameries, thus eliminating some of the unfair competition which results from lack of knowledge of the costs. Reasons for variations in the costs of manufacturing butter and in the price paid farmers for butterfat were shown by the analyses of the College after the new system of accounting was adopted. Furthermore, the system revealed the true financial condition of many creameries for the first time.

Invents Seed Scarifying Machine. Sweet clover is now the most extensively seeded clover in the United States. The satisfactory production of this legume is dependent upon prompt seed germination, a condition impossible prior to the practice of scarifying the seed. All of the sweet clover seed distributed by seed companies is now scarified. This has resulted from the perfecting of the scarifying machine for clover seed by the College. This scarifier quickly came into almost universal use.

Does Outstanding Work in Pipe Testing. *When the great state drainage program was underway, a considerable number of failures of pipe lines was reported. The work immediately undertaken by the College to determine methods of testing pipe and to correlate the strength of the pipe as revealed by tests with the load to be expected was recognized the world over as an outstanding, authoritative research. The direct benefit to the state lies in the fact that pipe, tile and sewer lines may now be laid with assurance against failure.*

Studies the Commercial Production of Timber. The College has completed a study of the commercial production of cottonwood timber in Iowa which shows that waste areas on the farm may be made to produce as much as 30,000 board feet of usable timber in a period of 35 years. Similar studies are now being made with reference to other timber trees.

Revises Apple Storage Temperatures. Jonathan and Grimes Golden apples—two of the most popular grown in Iowa—have been stored in the past at lower temperatures than that at which they keep best. This fact was shown in experi-

ments at the College. Jonathan was troubled with soggy breakdown at 30 to 33 degrees F., but not at 35 to 36 degrees F., the experiments showed. Grimes Golden stored successfully at 36 degrees F., but not at 30 to 33 degrees, which were the temperatures formerly recognized as standard.

Find Oats That Can Be Sown Late. A new variety of oats that withstands late sowing better than other varieties has been developed by the College in its study of crown rust. This new variety withstood late sowing better than other varieties and in addition outyielded all varieties with which it was compared during 1931 in cooperative tests in several oat-growing states.

Aids Farmers' Elevators. Two surveys of the farmers' elevators in Iowa have been made by Iowa State College. These surveys have provided information regarding the dangers confronting farmers' elevators by reason of changes in Iowa agriculture and the Iowa grain trade and essentials for success of these farmer-owned cooperatives. In this way the College has been able to assist the elevators which in turn provide the farmers with a good market for their surplus grain.

Promotes Good Health. Every student at the College becomes an example and messenger of good health. This is accomplished by: (1) Taking a health history and giving a careful examination of each student on entrance and each year while in school, (2) holding health conferences with such students as show physical defects or health impairments, (3) giving instruction in health principles both in the class room and in personal conference, (4) maintaining the

Informed Housewives About Iowa Food Products

A series of talks over WOI were given on the subject, "Know Iowa Products." Here the merits of corn, oats, meat and cheese as food products were explained. In response to this series of broadcasts, over 42,000 copies of the talks on the uses of corn products were requested and mailed out to housewives.

students' surroundings, such as food and water supply and living quarters, in sanitary condition, and (5) providing a well-equipped hospital and dispensary for the best of medical and surgical care.

Promotes Sound Industrial Expansion. *In order to promote the continuance of a sound industrial expansion in the state, the College produces men who are trained for the technical processes involved in many of the industries. Such men may serve an apprenticeship in industry outside of the state, but eventually many of them come back to Iowa. In addition, many of the graduates find employment in state industries immediately upon graduation. Much of the work in the engineering courses has been developed in response to a definite urge on the part of industrial groups in the state.*

Studies Cedar-Apple Rust. The College has found that cedar-apple rust in Iowa is able to complete its life cycle on only 30 percent of the apple varieties while strains of the same rust from the East were considerably more virulent and should be excluded from Iowa. One township in Iowa which is a heavy producer of apples, in cooperation with the College, practically eliminated cedar-apple rust by destroying all of the red cedar trees in the orchard sections. Destruction of the cedar trees was optional with the owners, but because of the educational work of the College they were willing to cooperate in this manner to eliminate an orchard disease which was important to them.

Does Outstanding Work in Dairy Bacteriology. The College has done important work on butter cultures and cream ripening in order to make a better quality butter. The work done by College bacteriologists on butter cultures stands today as the outstanding work in dairy bacteriology.

Saves Onion Industry in Pleasant Valley. In the Pleasant Valley onion district of eastern Iowa lies some of the highest priced agricultural land in the state. Four years ago a new onion disease, later called yellow dwarf, threatened

to make onions unprofitable in this area. It would have meant the loss of about 80 percent of the value of this land, and the end of an industry that brought in nearly \$1,000,000 annually. Knowledge gained by the College through research on this problem has given the growers a practical control measure and through cooperation in its use, little evidence of the disease is to be found in the infested area. The College is now investigating seedling blight and bulb rot, diseases troubling the onion growers in the St. Ansgar and Clear Lake districts of Iowa.

Advise Farmers When to Sell Corn. Because of a thorough study of corn prices following large and small corn crops, the College has been able to formulate a rule that may be followed in marketing corn. The study showed that in years of small corn crops, the best price, on the average, is obtained by selling the corn as soon as it is husked. In years of large corn crops, it pays to hold the corn for eight months after harvest. The farmers who followed the advice of the College made a few cents a bushel in 1929 and made from 15 to 20 cents a bushel in 1930. The results of the study have been made available to the farmers through a bulletin.

Elevators Have Been Strengthened. In many ways Iowa State College has been aiding and studying the problems of farmers' elevators in Iowa. Because of this it is significant to note that the farmers' elevators are stronger than they were 10 years ago. In 1921 they handled 42 percent of the commercial movement of grain in Iowa, but a recent survey showed they are now handling between 50 and 55 percent of the grain at country stations.

Promotes Meat Consumption and Home Butchering. *The College last year planned and conducted a home butchering campaign and "Home Butchering Week" in cooperation with other interests in the state. The result was a 25 percent increase in farm slaughter of livestock, and the loss of meats due to improper handling and curing was reduced by many thousands of pounds. A program of meat demonstrations for retail dealers and for city and rural women was*

Father of Morrill Act Describes Function of Iowa State College

From a letter written by Justin S. Morrill, the author of the national land-grant act, to Professor E. W. Stanton of Iowa State College (dated June 11, 1891):

"Agriculture and mechanic arts should be the foremost to be provided with the best instruction of all the ages, but, having this lead, all other branches of liberal learning should not be ignored or excluded, and whatever is included should be taught with absolute thoroughness. . . .

"A son of a farmer or a mechanic who desires a liberal education, preparatory to some different vocation from that of his father, should be able to find it in the land-grant college of his state, and should not be subjected to the inconvenience and increased expense of seeking it in a distant state. The sons of the state, for which they have an ineradicable birthright affection, have some right to receive, some duty to accept, within its home borders that instruction which will be to them of the highest utility."

conducted with the aim of stimulating meat consumption and providing a wider market for meat. These meetings were enthusiastically received by over 5,000 consumers.

Develops Spray Programs for Insect Control. The spray program for the control of the potato leafhopper was developed by the College about 10 years ago and is now widely used throughout the United States. In 10 years the increase in yield of potatoes from the use of Bordeaux mixture 4-4-50 averages around 40 percent. The timing of the codling moth spray, developed by the College, is an important feature of the apple spray program of Iowa.

Finds Soybeans Excellent Dairy Feed. For years Iowa farmers and dairymen were confronted with the problem of purchasing linseed oilmeal, cottonseed meal or some other high protein supplement to balance their dairy ration. Trials carried on at Iowa State College showed cracked soybeans were the equal of these purchased high protein supplements, and soybeans may be successfully grown on Iowa farms, thus making the purchase of feed unnecessary.

Helps in Improvement of Farmsteads. The distribution of places that were improved through the assistance of the College in 1931 was as follows: 1,382 complete farmsteads;

6,133 home grounds; 28 civic projects; 39 state parks and 3 state preserves—a total of 7,584 places. If the improvement of each place is estimated at but \$10, this service is worth \$75,840 to the people of Iowa. In addition, professional service is rendered to the State Board of Conservation in its work of acquisition, development and maintenance of state parks and preserves covering nearly 8,000 acres of land.

Increases Annual Egg Production by 39 Eggs. *Poultry flocks which are following the recommendations of the College based on research averaged 144 eggs per hen per year in 1931. The production records of general farm flocks were 105 eggs per hen the same year—a difference of 39 eggs per hen per year! At only 1 cent per egg, the increase in income to the state would be \$11,700,000 annually if the teachings were practiced by all the farmers.*

Helping Keep Potato and Onion Money at Home. By promoting and aiding the muck land vegetable industry of north central Iowa, in recent years much of the money that went out of the state for potatoes now remains in Iowa. Furthermore, Iowa has developed, with the encouragement and assistance of the College, onion growing to the point where hundreds of carloads of onions are shipped outside the state. The growers of Hancock, Wright, Worth, Cerro

Gordo and other counties look to the College for all-around leadership as to how, when and how many times they shall spray; how much and what fertilizers pay best; what varieties they shall grow; how they shall store and sell their crop.

Aids With Home Furnishings. Nearly a thousand letters about the selection and arrangement of furnishings for beauty and convenience of homes are written each year in response to questions raised by Iowa women.

Prepares Men for Agricultural Pursuits. In the past 10 years the departments of animal husbandry, poultry and dairy husbandry have graduated 571 men from the 4-year course, practically all of whom are engaged in agricultural pursuits. About 60 percent of these graduates are operating farms of their own or are working as farm managers. It is impossible to estimate the value of this service in dollars and cents, but it is none the less real.

Originated Idea for Cooperative Marketing of Butter. The College originated the idea of organizing a Cooperative Marketing Association for Iowa butter. This movement was agitated by the Dairy Industry Department for several years, and an organization was finally formed about 5 years ago. The present organization is marketing the products from 49 plants.

Wins More Landscape Architecture Awards Than Any Other School. Since entering national intercollegiate competitions, undergraduate landscape architecture students have won more awards than any other two schools combined. Graduates from this department are holding responsible positions with country and city park departments; many of them are operating in this state.

Furnishes Home Economics Teachers. Each year the College furnishes approximately 100 home economics teachers. It is designated by the State Board of Vocational Education as having the one training department in Iowa for homemaking teachers. Too, the College assists

in state and district teachers' meetings; and it has assumed the main responsibility for preparing the new high school state course of study in home economics.

Over 14,000 Specimens Examined Yearly in Veterinary Medicine Laboratory. Laboratory facilities are maintained by the Veterinary Medicine Division of the College, whereby a diagnosis can be secured at less than cost in those cases where ordinary diagnostic methods do not suffice. Fourteen thousand to fifteen thousand specimens from all sections of Iowa are examined each year in this laboratory.

Educates Through Film and Slide Programs. The 6,407 educational film and slide programs conducted by the College last year were attended by 615,000 people.

Improves Practices of Iowa Dairymen. Some of the improvements in the practices of Iowa dairymen since 1926, as a result of dairy extension work conducted by the College are: 5 percent more dairymen feed a balanced ration; 6 percent more feed grain to cows on pasture; 12 percent more feed grain to dry cows that are being prepared for their next lactation; 18 percent more legumes are being grown and fed.

Answers Inquiries on Livestock Feeding Methods. Each year a great many farmers say that answers to inquiries on methods of feeding have meant a saving to them of several hundred dollars. If this saving amounted to only \$10 for each of one-tenth of Iowa's 220,000 farmers, it would mean a total of \$220,000.

Assists in Growing Foods for the Needy. Twice during the past year the College has been called upon for advice in producing and storing vegetables for the needy. Several of the towns and cities have laid plans to help the unemployed by producing and storing food for the winter, and the aid of the College was sought.

Recommends Windbreaks and Shelterbelts. For a number of years the College has been stimulating the use of windbreaks and shelterbelts

on Iowa farms. Several hundred shelterbelt demonstrations have been set out in different parts of the state to demonstrate not only the best evergreen species for planting in the different localities and under different soil conditions, but also to show the best arrangement, spacing and cultural methods. This work is having a far reaching effect, adding beauty and comfort to the Iowa farmstead. During the past year the College has assisted either in the planting or the upkeep of 177 demonstration plantings.

Answers Inquiries on Industrial Problems. Several thousand inquiries on engineering and industrial subjects from industries, municipalities and individuals are answered annually by means of letters, bulletins and special reports.

Seeks Disease-Resistant Corn. The next big contribution to corn disease control may come through the development of resistant strains of corn. The College already is attacking the disease problem from this angle and progress has been made with two diseases—corn smut and Basisporium dry rot. There are hopeful signs that farmers in the future will be able to plant strains of corn that are disease-resistant.

Shows Way to Reduce Cost of Marketing Hogs. Of the hogs received at seven Midwest publicstock yards markets in 1931, 35 percent were re-shipped elsewhere, the College found. It costs about 25 cents a hundred to move hogs through a public market. The College has shown that if two-thirds of the hogs from the state were sent direct to slaughterers without going through public stock yards, it would save the state at least \$2,000,000 annually. Forty percent of the state's 10 to 13 million hogs marketed each year are still going to public stock yards. Any further portion that can be directed to the place of slaughter without going through the public yards will effect a proportionate saving to the state.

Holds 87 Schools of Instruction in Swine Diseases. The College the past year conducted 87 schools of instruction in swine diseases. They

were attended by 5,265 men, after which examinations were passed by 1,025 swine raisers who now have received permits to use serum and virus on their own swine.

Fights Farm Battle Against Freight Rate Increases. At three important freight rate hearings during the past year, the College has prepared and presented testimony protecting the farmers' interests against increases in the rates on his products. The first of these hearings was in Chicago in connection with a proposed 15 percent increase. The testimony presented by the College and other representatives of agriculture convinced the Interstate Commerce Commission that the condition of agriculture made such an increase unreasonable. Similar testimony was presented the past summer in two other cases. It is impossible to say how influential any bit of testimony is, but there seems to have been substantial benefit to agriculture from the testimony presented.

Improves Iowa's Market Poultry. Through the efforts of the College and the State Department of Agriculture, a series of meetings was held in 1928, 1929 and 1930 to bring about the elimination of marketing poultry unfit for human consumption. A very marked decrease in marketings of such types of poultry resulted, and more confidence on the part of eastern buyers in Iowa poultry was evidenced. Reports from eastern dealers reveal that Iowa people are getting from 1 to 2 cents more per pound for their poultry because of this improvement. As Iowa markets 80 million pounds of poultry each year, Iowa farmers are getting at least \$800,000 more per year for their market poultry.

Educates Through Library Service. Four times as many books are borrowed from the College Library annually by students now as 10 years ago; in 1921-22 over 22,000 books were lent for home use to the 3,895 students, while during 1931-32 the 3,985 students borrowed 113,272 books for home use. In spite of a small decrease in the number of students last year, the number of books lent increased by almost 6,000 over 1930-31. The total use of the library,

FARMERS CO-OPERATIVE ELEVATOR CO.

A. Carstens, Manager

DEALERS IN

Grain, Coal, Live Stock, Gasoline and Oil

Radio Station WOI,
Ames, Iowa.

Gentlemen:

Ackley, Iowa, June 25, 1932

Ours is one of the many buying stations using your market reports every day. We certainly appreciate them. We save about \$30.00 every month because of these service reports. If you would not furnish them it would be necessary for us to telephone and wire for markets and the cost would be quite high.

We hope this very helpful service will not be discontinued.

Very truly yours,

Farmers Elevator Co.

A. A. Carstens, Mgr.

including books used within the building, amounts to considerably over a million volumes a year. The use of the library is much larger than at many institutions throughout the country, although some of these institutions spend much more proportionately on their libraries. Two middlewestern universities each lent an average of 13 books per student; another lent 10, while another lent but 5 books per student for home use. The average at Iowa State College last year was 28 books per student.

Presents 5,727 Agricultural Programs Over Radio. During the last fiscal year, the College presented 5,727 service report programs over station WOI. These were distributed as follows: 1,995 livestock market programs; 933 grain market programs; 311 dairy produce programs; 622 poultry market programs; and 1,866 weather report programs.

Develops New Method of Corn Breeding. The College discovered and demonstrated the very simple and practical method of improving field corn and sweet corn by the use of prepotent, inbred sires on standard commercial varieties. The results have been tested for three years on the Experiment Station plots and in the State Yield Test, and corn breeders have shown great interest in the idea. In developing this new breeding method, a series of inbred lines has

been produced which can be released to corn breeders whenever the College desires to do so. This "top-cross" system of breeding is the only practically method of breeding with inbred strains that can also be used on animals such as swine and poultry.

Devises Tests for Sound Absorbing, Heat Insulating. Simple methods of testing wall-board and similar materials made from cornstalks and other farm wastes for their heat-insulating and sound-absorbing qualities have been developed at Iowa State College. These tests should aid in the development of the farm by-product-using industries.

Gives Service to Iowa Weekly Newspapers. The College issues a weekly clip-sheet to weekly papers of the state—more than 500 of them. This clip-sheet contains stories of value to Iowa farmers and small-town residents based on experiment station projects, extension service activities and information gathered by college workers.

Enriches and Enhances Rural Life Through Landscape Planning. While the landscape architecture work done by the College does not deal directly with the increase in commodity production, it does consider the proper, efficient and convenient planning of farmsteads, home

grounds and civic projects, thus enriching and enhancing rural life in Iowa and adding to the monetary returns. County-wide groups of voluntary leaders trained at the landscape project schools helped carry the educational program into every section of the state.

Points Way to Get More Money for Livestock Marketed. The farmers selling livestock through two cooperative shipping associations operating under identical conditions may get a difference of 20 to 40 cents a hundredweight in net returns from their hogs. The College found this to be true, and by careful analysis of the records and methods employed by different associations it has shown the way to more efficient operation.

Works for Higher Returns from Eggs. The College is advocating the improvement of the quality of eggs and the selling of eggs according to grade or quality. "Extra Firsts" usually sell for at least 2 cents a dozen premium in Chicago. In 1931 Iowa marketed nearly 3 million cases of eggs at the four principal markets. If only a fourth of these graded "Extra Firsts" it would give Iowa producers an added income of \$100,000 as compared with selling the eggs at average current prices.

Answers 60,000 Radio Inquiries from Homemakers. That there is a very large response from listeners to the WOI radio programs is evidenced by the fact that the Homemakers' half-hour program has drawn 59,916 inquiries. This program in February, 1932, was increased from a two-day-a-week program to five days a week. The program is continually drawing a greater response, for 41,469 of these inquiries came in during the fall, winter and spring quarters of the last fiscal year.

Helped in Unemployment and Relief Work. Last year the organization work that was done by the Engineering Extension Department of the College for the Committee on Employment and Relief reached 47 counties.

Makes Valuable Studies of Agricultural Waste Products. *Recently the College has undertaken*

a study of the commercial uses of agricultural waste products such as cornstalks, straw, beet pulp, oat hulls and the like. The development of a commercial process for the manufacture of furfural, the discovery of means for making paper and wall board from straw and stalks, studies in the processing of soybeans and the like, have attracted national attention. So important has this work become that the United States Department of Agriculture has now established a regional experiment station at this institution for the purpose of expanding this program.

Solves Barley Stripe Problem. Effective control measures have been worked out by the College for dealing with barley stripe. The relation of this disease to the yields of nine principal barley varieties has been determined.

Durability of Prepared Roofings Studied. An investigation of the durability of prepared roofing has been made by the College, and some of the essential characteristics insuring long life have been determined.

Increase the Durability of Native Woods. The College has determined by experiment that such perishable woods as cottonwood, willow and maple can be increased in durability from 500 to 600 percent. This has made possible the utilization of many inferior woods for fence posts. Since Iowa uses approximately 25 million fence posts a year, the findings in this experimental work make possible the saving of many thousands of dollars for farmers.

Two Weeds Get Special Attention. The weed control program of Iowa State College has been given special emphasis by establishment of a field station near Hawarden to learn how to destroy noxious weeds, especially Creeping Jennie and Leafy Spurge. Thorough study of the problems of weed control will be made at this station and the information relayed to farmers in other regions. The College has held demonstrations on weed control in every county of the state and 70 counties have been assisted in the development of a weed control organization consisting

of weed commissioners, township trustees, county supervisors and representatives of farm organizations.

Disseminates Information on Child Health. The College broadcasts talks to parents on health problems of childhood, on behavior problems in growing children, and on suitable books, plays and toys. It assists in the Children's Clinic at the state fair, and through exhibits at the state fair and at short courses has shown play equipment that possesses educational value.

Pays to Store Oats. Iowa ships about 25 million bushels of oats during August and September, the College has found. Demonstrations in storing oats, carried on with a group of elevators, show that it is frequently possible for a country elevator to store the harvest time surplus of oats at profits ranging from several cents to as much as 14 or 15 cents a bushel without assuming any speculative risks. Even five cents additional profit to growers of Iowa on 10 million bushels of this harvest time movement would mean a saving of a half million dollars a year. The saving would be at least as large with corn.

Increases Efficiency of Dairy Cows. *The effect of the dairy extension program of the College is shown by the fact that during the period, 1920-1930, the number of dairy cows in Iowa increased but 4.8 percent while the production of creamery butter increased 142.6 percent. Though the yield of milk and butterfat has risen markedly the number of cows has remained approximately the same.*

Boosts Iowa Beet Sugar. Sugar made from beets grown on Iowa farms is just as good as cane sugar. This fact has been established in researches at the College, thus settling a question that has long been in the minds of housewives.

Prepared Comprehensive Farmstead Planning Bulletin. A comprehensive bulletin on farmstead planning was published by the College this year. This is one of the most thorough treatises on the subject.

Presents Information on Sterility and Breeding Diseases of Cattle. The College has accumulated much valuable information on sterility and breeding diseases of cattle. More intense study is being given here to these subjects than in any other state.

Tests Soils and Recommends Treatments. Each year the College tests many hundreds of soil samples to determine needs for lime, phosphorus, organic matter and the like. The advice given is based not only upon the tests made but upon the results of the experimental work on soils which shows how most of the important soil types will respond to treatments. By testing their soils and following the suggestions on treatment and fertilization, many Iowa farmers have realized the difference between a poor crop and a profitable crop.

Helps to Organize and Construct Creameries. The College has assisted the farmers in the organization of cooperative creameries and with the planning and building of creameries. This work was started in 1910, at which time creamery promoters were operating in the state and usually charging the farmers about 100 percent more than it actually cost to build and equip a plant. This work has saved Iowa farmers several hundred thousand dollars.

Gives Agriculture Valuable Green Manure Crop. Hubam, a rapid growing annual clover which can be seeded with small grain and plowed under in the fall of the same year, was found at the College and given wide distribution. The value of this legume under a great variety of conditions has been demonstrated and now that the seed is becoming plentiful, it is being used extensively as a green manure.

Aids Brick and Tile Industry. The brick and tile industry of the state is an important one, and the College has conducted experiments in the utilization of Iowa clays for various ceramic products. It has cooperated with many plants in solving their manufacturing problems and has developed a number of devices that have been useful in the clay working plants.

Popularizes Self-Feeding of Swine

Many tests have been conducted at the College to find what saving might be effected by self-feeding growing and fattening pigs. It is conservatively estimated that the self-feeding method which has been popularized by the College is responsible for a saving of \$1 per pig. Iowa marketed approximately 13 million head of hogs last year. If we assume that one-fourth of the producers of these pigs follow the self-feeding practice, the saving to Iowa producers alone is more than 13 million dollars annually.

Determines Fly-Free Date for Wheat Farmers. *The College keeps seasonal records of the primary pests of the state and thereby is able to give specific information on the exact time for effective remedial measures. Thus the damage by the Hessian fly has been greatly reduced. Last year in western Iowa, two farmers, whose rental and operation costs were nearly identical, each planted 80 acres of wheat. One of them sowed early in September, the other waited until after the College announced the fly-free date. The former harvested 12 bushels per acre; the latter, 40 bushels. During the past 10 years thousands of Iowa farmers have observed the fly-free date.*

Develops Poisoned Baits for Insect Control. The development by the College of a commercially prepared poisoned bait for armyworms, cutworms and grasshoppers represents a distinct advancement in control work and a great saving in labor and cost of materials for Iowa farmers.

Establishes Four-County Soil Improvement Work. The Four-County Soil Improvement work established by the College in two groups of counties in southern Iowa has proved of great value to those counties. The demonstrational and experimental work has shown farmers in those counties how to secure better crop yields per acre, how to reclaim and make land productive, how to terrace eroded areas, and how to manage their soils properly.

Provides Leadership for Horticultural Organizations. Many of the staff members of Iowa

State College have taken active part in the leadership of the several horticultural organizations of Iowa, including the Federated Garden Clubs of Iowa, Iowa State Horticultural Society, Society of Iowa Florists, and Iowa Vegetable Growers' Association. In addition to serving as officers, college staff members have acted as judges at many local, county and district shows and expositions.

Helps Get Sound Cooperative Laws. Working with cooperative organizations of the state, Iowa State College has been instrumental in bringing about the passage of cooperative laws adapted to the needs of Iowa farmers. Iowa has experienced no large scale cooperative disasters. The developments have been conservative and, on the whole, constructive.

Establishes Hereditary Basis for Natural Resistance to Disease in Poultry. This project is nearing completion by the College, and it will be one of the first real demonstrations that natural resistance to disease in animals can be developed by proper breeding methods. As a result of the project, some exceedingly good inbred strains of White Leghorns have been produced; these should be of great value in the near future as sires for flock improvement.

Studies Trunk Line System. Closely related to the design of roads has been the study of the economic considerations involved in laying out a trunk line system. For this purpose the engineers require statistical data with reference to: the operating characteristics of the traffic on the highways, tractive resistance of various types of

road surfaces and the effect of grades and the type of surface upon fuel consumption. All these questions have been studied and reported upon and have been exceedingly valuable to highway authorities.

Advocates Reforestation of Less Productive Areas. The College for a number of years has been assisting land owners in reforestation of areas on the farm unsuited for the production of agricultural crops. Already many such plantings are demonstrating the possibilities of different tree species for this purpose. During the past year the College has assisted in 53 demonstration plantings. This is a work closely allied with the proper utilization of land.

Studies Mold of Corn in Storage. Successful storage of grain is dependent upon holding in check molds which occur on the grain and which flourish when the moisture content is too high. The College has been studying this problem. An outgrowth of this study is one in which consideration is being given to the deteriorating activities of grain molds and molds on agricultural wastes with the hope that valuable products can be obtained through their action.

Interests 6,986 Women in Clothing Project. The success of the clothing project conducted by the College was due to the combined efforts of specialists, home demonstration agents and 909 local leaders. The project last year was adopted by 6,986 farm women. Foot health was reported on by 1,574 women; over 1,879 women reported improved posture, and 8,999 garments were made using the methods taught.

Circulates Thousands of Books Through Radio Book Club. The Radio Book Club, organized by WOI, the College station, has circulated 13,545 books in the 32 months of its existence. The club is self-supporting and has a total of 891 members located in 95 counties in Iowa and adjacent states.

Helps to Solve Farm Business Management Problems. Last year over 300 farmers were given detailed assistance with business management

problems through farm management associations organized and supervised by the College. Over 1,000 farmers assisted in keeping and analyzing farm business records. Farm accounting forms were made available to interested farmers, and many were given assistance on lease problems.

Helps to Increase Size of Litters Over 30 Percent. *Largely through the program of swine improvement conducted by the College, the size of litters in Iowa has increased from 4.6 pigs per sow in 1922 to 6 pigs per sow in 1931—an increase of nearly 31 percent. Thus 500,000 less brood sows are required to produce Iowa's usual crop of hogs. The College conducts breeding stock selection demonstrations in every county in the state, it sets up swine herd test demonstrations, conducts a state-wide pig crop contest, and leads a program of sanitation and prevention of losses from disease and parasites. The latter program has been adopted by more than one-third of the farmers in the state.*

Increases Interest in Fruits, Flowers and Vegetables. Interest in the home growing of flowers and vegetables has been stimulated by the College through work with local and state garden clubs and organizations of farm women. Through fruit schools and orchard demonstrations, fruit growers have been improving their cultural practices.

Demonstrates New Material for Vacuum Tubes in Broadcasting. A substance known as tourmaline can be used as well as quartz in stabilizing the frequencies of vacuum tubes in radio broadcasting stations. This was recently demonstrated by the College and is of great value commercially. Work is now under way at the College which promises a practical method of producing short radio waves commercially.

Influential in Treatment of 107,731 Horses for Internal Parasites. During the past year the College organized 281 townships in 34 counties and 1,629 leaders for the purpose of combating nose flies and other parasites of horses. The 127 meetings held were attended by 5,192 horse owners and resulted in the treatment of

107,731 horses. This work saves feed, increases health and horse power, reduces loss from colic and kindred conditions, improves development of better colts and reduces fly annoyances to teams and drivers while at field work during hot weather.

Helps Determine Principles of Highway Safety. Under the direction of the National Research Council, Iowa State College has been carrying on research to help determine principles of highway safety.

Aids in Amateur Dramatic Productions. The College is helping rural and urban Iowa to provide some of its entertainment by disseminating information concerning amateur dramatic productions. This has been accomplished by personal conferences, correspondence and extension work.

Studies Individual Farm Enterprises. Special studies have been made by the College of the various enterprises important on Iowa farms. These include the hog enterprise, the corn enterprise, commercial cattle feeding, and now a study of the soybean crop is under way. By means of these studies, the College has been able to point out to farmers the profitableness of various methods of production. Standards have been developed whereby individual farmers can measure their own performance.

Develops Local Home Project Leaders. In home project work with clothing, foods, home furnishing, home management and child care

and parent education, the College has developed the local leader training method among rural women. This method of teaching enables a much larger number of people to be served with a given number of specialists, and develops local leadership. Meetings held by these local leaders increased from about 13,000 in 1928 to over 38,000 in 1931; the number of local leaders trained increased from about 7,000 to 10,000.

Studies Problems in Bacteriology. During the past few years the College has been carrying on studies in the fields of fermentations, sanitary bacteriology and physiology of bacteria which are contributing to solutions of industrial and farm problems of the state. The work in fermentations has produced a number of leads which it is hoped will make possible the utilization of farm products which now go to waste. In cooperation with the United States Department of Agriculture, progress has been made along these lines including the possible recovery of valuable acids, combustible gases and other by-products through the aid of bacterial decomposition.

More efficient methods for the disposal of creamery and packing house wastes have been developed through bacteriological investigations with considerable benefit to dairy and packing house industries.

Truck Doesn't Stop Livestock Price Fluctuations. A study which the College made of prices at markets where a considerable part of the stock is now received by truck shows that prices fluctuate in practically the same way now as when

Gives Young Folks Best Chances in Life

The most valuable products of the state are its boys and girls, and their parents will continue to demand that higher education be maintained within their reach at reasonable cost. Iowa State College supplies this need. It is also highly important to the future of the state that democracy in education be assured so that the boys and girls from any walk of life who possess ambition and the necessary mental ability and preliminary training will have a reasonable opportunity for a college education. Iowa's young folks must be given the very best chances in life.

most of the stock came by rail. At one market it was found that less than 2 percent of the producers selling on the market were living close enough to move their hogs to market in response to an increase in the price that day.

Contributes to the Development of Rural Communities. The objective of all extension and community development work is higher standards of living. This is accomplished by the College through the Iowa program of rural sociology work, as follows: Interprets the results of rural life studies through press articles, radio statements, correspondence, conferences, etc.; helps to coordinate the forces of institutions and organizations operating in rural communities, by means of church conferences and programs, school calendars, fair programs, library services, state and national country life conferences; aids the local units of farm organizations to function efficiently and effectively; guides and stimulates the development of recreation and such avocational activities as will directly contribute to better living and morale by encouraging drama, music, folk games, social games, books; contributes to the social, cultural and inspirational phases of the junior program by means of social parties, music and drama, and the like. As a result of this rural sociology work directed by the College, township farm bureaus having duets or quartettes in their programs increased from 298 in 1930 to 419 in 1931, and those having orchestra music from 187 to 216; exchange programs presented by township farm bureaus increased from 194 to 296; township farm bureaus presenting home talent plays increased from 170 in 1929 to 375 in 1931; and township farm bureau meetings held by county farm bureaus increased from 5,681 in 1929 to 6,821 in 1930 and 7,343 in 1931.

Direct Marketing Has Not Hurt Livestock Prices. The College has sought an answer to the controversy that has raged as to whether direct marketing of livestock has lowered prices. This study indicates that direct marketing has not hurt prices. The producer may take advantage of the attractive bids made by the direct purchaser providing he adequately protects himself

against the time when these bids may not be satisfactory.

Works on Methods for Utilizing More Iowa Coal. *Researches in the utilization of Iowa coal have been carried along by the College for several years, and some progress is being made toward development of a method of briquetting Iowa coal. This is believed to be a step that will greatly increase the use of this fuel for domestic purposes. It has also assisted in the development and checking of the process of burning powdered coal. In all of this work it has cooperated closely with the coal mining industry in the state.*

Prevents Large Boost in Freight Rates. At least a million dollars a year is saved in freight rates on hogs shipped from Iowa by rail to market as a result of evidence presented by workers from the College and other representatives of producers. The railroads asked for increases ranging from 10 to 37.5 percent, averaging about 23 percent. The Interstate Commerce Commission decided that, as a result of the evidence of the College and representatives of producers, the increases asked for were not justified. Instead of granting the increases asked for, the Commission granted increases ranging from 0 to 15 percent, averaging about 8 percent.

Takes "Inventory" of Iowa Lands. The soil survey work carried on by the College is providing the people of Iowa with an "inventory" of their lands. The 68 soil survey reports that are now available have proved of utmost practical value to Iowa farmers.

Studying Problems of Southeastern Vegetable Growers. Extensive experiments are now under way to determine the best fertilizers, rotations and irrigation practices for the early sand land vegetable growers of southeastern Iowa. This work by the College it is anticipated will add greatly to the prosperity of the men and women on land in this region.

Develops Disease-Resistant Cabbage. A strain of cabbage selected from the variety, Copen-

hagen Market, has been developed by Iowa State College. It is resistant to the disease called cabbage yellows. Development of this disease-resistant strain has made it possible to grow cabbage again on land that heretofore could not be used for that purpose. Work is now in progress to increase the resistance of this strain, improve the uniformity and compactness of the heads, and to secure earlier maturity.

Helps in Soil Erosion Control. The College has taken an active part in the work of controlling erosion by tree planting. One project of considerable size has been under way for 10 years and has shown definitely the value of trees in controlling erosion on deeply gullied land. Another project has been under way for three years and is beginning to produce results. In addition 100 or more smaller soil erosion cooperative plantings are serving as object lessons to farmers in different parts of the state.

Helps Clay Working Industry. The Ceramic Engineering Department of the College was established on the specific request of the clay working industry of Iowa. Its work is of such a character as to train men for work with the heavy clay products manufactured in Iowa, and for the research incident to the development of this field. It also trains men and women for the ornamented ceramics industry which may be a factor in the development of industrial Iowa.

Sends Fruit Spray Notices to Orchardists. *For years those with orchards in Iowa have depended on the College for information about spraying. Approximately 10,000 farmers and fruit growers in about 50 counties are sent notices by the College each year, advising them of the approximate date to apply each orchard spray. This practice of sending notices to interested Iowa fruit growers has been followed for the past five years.*

Aids Commercial Florists. Experiments carried on in the College greenhouses have demonstrated these facts: Chemically softened water is not as good for plants as rain water or well water and may be detrimental; paper and paper

mache pots are not equal to clay pots for plants; Iowa gladiolus corms can be forced successfully if they are stored after curing at a temperature of 90 degrees F.; Clarkia, Stocks, annual Larkspur, Lupin, Mignonette and Candytuff are profitable greenhouse crops.

Develops New Valuable Chrysanthemums. Reardon's Late Pink and Mrs. Mary Sherman are valuable commercial chrysanthemums of the small flowered type developed at the College. The John Reardon is a promising large flowering variety introduced by the College.

Saves Farmers from Planting Worthless Foreign Clover. *In the past much red clover seed was imported from Europe and South America. Tests made at the College through a number of years showed this imported clover seed to be practically worthless under Iowa conditions. As a result of this work and of other studies conducted through the cooperation of the United States Department of Agriculture legislation was enacted requiring that such imported clover seed be stained red. This has resulted in the practical exclusion of such seed.*

Improves Land With Sweet Clover. The College has shown the farmers of Iowa that sweet clover is a soil building crop, that along with proper treatments it will restore fertility. Many acres of land have been improved in productivity by the use of sweet clover as a green manure. This work has been of great value to farmers in many sections of the state.

Develops and Distributes New Wheat Varieties. In certain parts of Iowa winter wheat is an important field crop. Four new varieties of wheat superior from the standpoint of yield, non-lodging and non-shattering, and quality of grain, have been developed, tested and distributed to Iowa growers by the College. These varieties are rapidly coming into general use, one of the varieties already being reported as grown on a third of the Iowa acreage.

Stimulates Use of Better Quality Proteins. Iowa farmers have lost thousands of dollars an-

Distributes Five New Apple Varieties

Five new varieties of apples which are hardy in northern Iowa, productive, of good quality and can be stored until midwinter have been bred and distributed by the College. These new varieties are: Sharon, Hawkeye, Monona, Ames 426 and Ames 471.

nually with swine because they did not use the right kind and right quality of supplementary feeds. The College has demonstrated time and time again the value of milk products, meat by-products, or the combination of one of these with some of the other protein carriers such as linseed oilmeal, soybean oilmeal and others of vegetable origin.

Enables Poultry Raisers to Save \$3,000,000 Annually. The instructions on feeding and formulas given by the College through bulletins and over the radio enable farmers to save 50 cents to \$1 on every 100 pounds of mash feed. Therefore the estimated potential savings on feed for 30 million chickens raised in Iowa per year is \$3,000,000.

Improves Quality of Pasture for Swine. The College has carried on pasture work for a number of years and is responsible in large measure for the popularizing of Dwarf Essex rape. Rape is a high-class forage for swine inasmuch as it furnishes green leaves during the hot summer months when the bluegrass and some of the legumes are almost worthless. Thousands of Iowa farmers who formerly pastured their pigs on dry, hard bluegrass in July and August now pasture their pigs on legume forages or rape.

Increases Production Per Cow Through Record Keeping. Twenty-two years of systematic record keeping as instituted by the College had been completed by Sept. 1, 1931. In 1909, records were kept on 688 cows in 51 herds in 2 cow testing associations. The average production of these cows was 5,260 pounds of milk and 207 pounds of fat. This year 48,293 cows in 2,577 herds in 102 associations averaged 7,665 pounds of milk per cow and 303 pounds of fat.

Does Research on Poultry Diseases. Research conducted by the College is gradually bringing to light causes and probable means of preventing many of our poultry diseases.

Saved Millions With Hog Cholera Control. *Previous to the present system of hog cholera prevention, losses from this disease often ran as high as 25 percent in Iowa (1913). The College provided serum for several years and organized the control work in Iowa. The estimated average annual saving to the swine industry over previous losses is \$3,000,000.*

Establishes Pressure Cooker Technique. The College workers found that by allowing the steam pressure cooker to exhaust 7 minutes before the valve is closed to raise the pressure, large numbers of jars of canned products may be saved from spoiling.

Furnishes Farm Building Plans. Farm building plans that represent the most advanced practice in arrangement, materials and economy, are furnished by the College to Iowa residents. A list of about 100 plans is available. About 2,000 of these are distributed upon request each year.

Studies Value of Living on Iowa Farms. The College recently completed a study of the consumption of 147 Iowa farm families, the first study of its kind ever made in the United States. For three-fourths of these families the value of living fell between \$1,200 and \$2,400; the average size of family was 4.8 persons. The farm furnished an average of 4.6 percent of the value of living of all the families.

Prepares Agricultural Teachers. In addition to the 150 teachers of home economics, industrial

arts and the various sciences that the College furnishes to Iowa each year, approximately 30 highly qualified teachers who are able to teach agriculture in combination with other subjects are prepared annually for Iowa public schools. This annual increment of teachers of practical subjects is performing an important part in preserving a proper balance between the strictly academic subjects on the one hand and those of a more practical value on the other.

Distributes Low Cost Menus. How to reduce the cost of food for the family without impairing the adequacy of the diet is one of the problems which the college has been attacking. Low cost menus have been distributed in large numbers and attention has been called to economical foods and to economical ways to prepare and serve those used.

Helps to Prevent Widespread Damage by Insects. The College keeps a constant lookout for serious insect pests and warns farmers so that sporadic outbreaks may be checked before widespread damage is done. During the past two years heavy losses have been prevented by broadcasting poisoned bran mash before grasshoppers spread from their breeding grounds into cultivated crops.

Conducts Home Landscape Short Courses. Last year over 100 people attended the Farmstead Planning and Home Landscape short courses held at the College. Fifty people attended the new short course on Community Planning. The Roadside Improvement Conference, also held at the College, resulted in the organization of the Iowa Council for Roadside Improvement.

Gives Information on Lard. *The College is telling housewives the best means of rendering and keeping lard. A large collection of recipes for using lard as the fat in cooking is being widely distributed.*

Recommends Insect Control Measures. The use of the gypsum-calcium arsenate mixture developed by the College to control the striped and

spotted cucumber beetles represents a marked advancement in the method of controlling these pests. It is now used by practically all of the melon, cucumber and pumpkin growers in the state.

Improved Keeping Quality of Home-Canned Farm Products. The preparation by the College of time tables for processing non-acid fruits and vegetables such as corn and beans, and for processing pork and beef has resulted in marked improvement in the keeping quality of home-canned farm products.

Interests Nearly 15,000 Women in Home Management Projects. Believing that the efficient use of time, money and energy is worthy of definite study, 14,494 women took part in the home management project conducted by the College last year. Specialists, home demonstration agents and 1,624 local leaders helped to conduct this work in 384 townships in 24 counties.

Holds Hog Feeding Schools. A program of efficient and economical feeding of hogs has been promoted by the College through feeding schools held in practically every county in the state and, in 1932, by pig feeding demonstrations in 21 counties. These agencies have demonstrated the necessity of feeding a balanced ration, the value of pasture in cutting feed costs, and the best methods of utilizing home-grown feeds for the most efficient production of pork.

Interprets Results and Disseminates Information Through Bulletins, Circulars and Other Publications. Results obtained by the Agricultural Experiment Station are interpreted and made known largely through College bulletins and circulars. In the first 6 months of 1932, the Bulletin Office responded to 17,440 requests for bulletins, circulars and other information.

Helps to Double Honey Production Per Colony. During the past 12 years the state average of honey production per colony has increased from 70 to 80 pounds; the average of the demonstration colonies supervised by the College, however, is 163 pounds. This shows that the

production per colony can be doubled, and that \$4.15 more per colony can be realized by following the practices advocated by the College. If half of the state increase of 10 pounds can be attributed to the educational campaign of the College, it would mean 25 cents for each of the 200,000 colonies or \$50,000 in increased returns to the state.

Assists 700 High Schools, 4,000 Rural Schools. About 700 high schools and 4,000 one-room schools were given assistance last year by Iowa State College in the teaching of agriculture. All of this assistance was given upon request.

Develops Fly Sprays. The College has taken an active part in developing household and cattle fly sprays. Considerable attention has been given to sprays that do not injure the skin of cattle.

Helps to Reduce Bee Diseases. Inspection work conducted by the College has shown that disease among bees can be reduced greatly. In Woodbury County, where many carloads of honey are produced annually, disease among bees was reduced from 16 percent to 2 percent.

Advocates Shifting Production and Rotation. *In crop production the College has strongly advocated a rotation of crops which if carried out would reduce the acreage of corn and oats by 2 to 3 millions of acres and make a corresponding increase in the acreage of clover, alfalfa, sweet clover, soybeans, and mixed meadow and pasture. Such a program would increase soil fertility, reduce soil erosion and provide cheap protein in the form of legume hay and pasture; it would reduce the total number of bushels of corn and oats but would increase the number of bushels produced per acre; it would mean corn at less cost, protein feed at less cost, and better and more efficient feeds for livestock. Already the acreage of alfalfa has increased from about 175,000 acres in 1920 to 450,000 in 1930; the amount of sweet clover has increased rapidly in recent years, and the total acreage of soybeans is now about 110,000 acres as compared with about 45,000 in 1927 and 70,000 in 1929.*

Originated Idea for Iowa State Brand Butter. *The idea of establishing a state brand for Iowa butter originated at the College. The Iowa State Brand was established by the Iowa legislature in 1914, and about 33 creameries are today marketing butter under the brand.*

Helps Associations With Accounting, Law. The College prepared an accounting system and helped install several hundred of the systems in cooperative livestock shipping associations in Iowa. The College also assisted in preparing a law, which was passed by the Iowa Legislature, permitting associations to organize on a non-stock, non-profit basis, free from income tax payments.

Analyzes Farmers' Accounts. The College has for five years been analyzing the accounts kept by individual farmers and by those in cooperative farm accounting associations. This service has been of large value to the farmers in checking their operations and in planning and reorganizing their business.

Trains Local Leaders for Girls' Clubs. The number of local leaders trained by College workers increased from about 700 in 1924 to nearly 1,800 in 1931, and the meetings held by local leaders from about 6,000 to 12,000.

Conducts Newspapermen's Short Course. Each year the College conducts a newspapermen's short course for weekly newspapermen of Iowa, during which the newspapermen exchange ideas and practices by which they serve their clienteles (largely farm clienteles) and through which information about agricultural activities is given to them.

Trains 27,034 Boys and Girls in Club Work. The Iowa 4-H club program has made a steady growth in membership since 1927. For that year 17,776 boys and girls were members. The 1931 enrollment was 27,034 or approximately 270 for each Iowa county. Club work as conducted by the College has brought to farm boys and girls opportunities for educational work at home. In their project work they have learned the ap-

proved farm and home practices, and for the most part their enterprises have yielded substantial financial returns.

Helps to Reduce Fat Losses in Buttermilk. A study on the reduction of fat losses in buttermilk is now being carried on at the College and will be continued for several years. An incomplete survey reveals that a material saving has already been made, and when this work is completed the annual saving to Iowa creameries should be considerably above \$100,000.

Brings Flax Back. *Through efforts of the College, flax, with a gross acre return two to three times that of oats, is increasing rapidly in Iowa. This is made possible through the use of wilt resistant varieties. These new varieties have been tested and compared for their adaptation to Iowa.*

Shows Soybeans Are Good Food for People. Soybeans, fast becoming an important crop on Iowa farms, have a high value for human as well as for animal consumption, the College has shown.

Canning, Nutrition, Meal Planning Furthered. To all corners of Iowa the latest and best information available has been given to Iowa housewives on the important problems of home canning, meal planning and nutrition. The College has used the radio, meetings, the press and correspondence to get this information out. Canning talks have been timed according to season from early spring until late fall.

Trains Men Through Industrial Short Courses

Last year 2,092 persons attended the industrial short courses offered by the College. This is one of the methods by which the Engineering Extension Department accomplishes adult education. Over 1,100 persons were enrolled in extension classes, and 600 of these were foremen in industrial plants. A fuel conference devoted to effective utilization of Iowa coal was attended by 197 engineers, coal operators, etc. A concrete contractor reported that the concrete school attended by him was worth \$6,000 to his organization the first year.

Will Soon Offer Control Method for Enteritis of Swine. Enteritis of swine produces at present almost as great losses as hog cholera. The cause and nature of this disease have been worked out at the College, and control methods should soon be available.

Has Given Information on Infectious Abortion. It is of great significance to the dairy industry and to public health that the College has demonstrated that the dairy cow is not the most important factor in the production of undulant fever. The danger of infectious abortion of cattle to public health was a very important question to the dairy industry.

Designs Silo and Tile Building Blocks. The use of tile building blocks in silo construction was introduced by the College. Over 10,000 of these silos, known as the Iowa silos, have been built and proved to be permanent and economical.

Develops Concret Building Block. The Department of Agricultural Engineering of the College has recently developed a new type of concrete block, styled the L-block, which furnishes a permanent durable construction suitable for farm buildings.

Makes Extensive Studies of Wind and Fire Losses. *The College has made extended studies of wind and fire losses of farm buildings. Many of these losses can be avoided, and the College is assisting in an educational program to introduce safety measures to reduce such losses.*

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Advocates Approved Sires. There have been 117 sires proved through cow testing association records since 1925, and records were obtained on 1,099 sires through the 1931 "Better Sire Contest."

Answers 1,683 Poultry Inquiries. The Poultry Husbandry Department of the College reports that 1,683 inquiries relative to poultry problems were answered during 1931.

Points Way to Better Dairy Feeding. No cow, no matter how well bred, will yield large quantities of milk and fat without being well fed. The increased production per cow in Iowa the last few years can be largely attributed to the newer knowledge in dairy feeding. The College has through researches added greatly to the dairy feeding knowledge.

Urges Farmers to Use Home-Grown Feeds. Iowa farmers have been urged by the College to use home-grown feeds as much as possible for their dairy cows. When this program has been followed efficiently, dairying has proved relatively profitable even in the present depression. Many thousands of dollars have undoubtedly been saved Iowa farmers who have followed the program advocated by the College. The highest herd in the Iowa cow testing associations last year (W. D. Mitchell of the North Tama Cow Testing Association) averaged 574 pounds of butterfat per cow. The owner of this herd followed the Iowa State College program of feeding almost to the letter. Many others are doing so.

Produces and Disseminates Superior Varieties and Strains of Corn. *During a 10-year period the most promising strains and varieties of corn have been tested by the College for yield and adaptation in the different parts of the state in the state corn yield test. From 300 to 800 entries have been tested each year. (Co-operative with Iowa Corn and Small Grain Growers' Association.) Markedly superior corns have been found and these have had ready acceptance over a tenth of the Iowa acreage; over a million acres are now being planted to these recently discovered strains.*

Present Work Will Influence Swine Breeding and Feeding Operations. The Swine Performance Record work is an outstanding example of what the College is doing for the Iowa hog producer. If a strain or family of swine could be found that would require 50 pounds less feed for each 100 pounds of gain made, Iowa farmers would save millions of dollars. Another project just started, "The Influence of Feed, Especially Soybeans and Soybean Products, Upon the Character and Quality of Fat and Lard from Swine," appears likely to have a large influence upon future farming operations in Iowa. The College is also attempting to answer the question, "Do pigs grown and fattened on grain supplemented with soybeans produce soft carcasses?"

Demonstrates Value of Liming Acid Soils. *Much work has been done by the College in demonstrating extensively the value of liming acid soils not only for legumes but also for general farm crops. As a result, 1,250,000 tons of limestone have been applied to Iowa soils since 1925. Liming a southern Iowa soil gave 3 tons of alfalfa where on unlimed soil there was none.*

Develops Wonderful New Pear. The College has bred and distributed a very hardy, blight-resistant pear with wonderful flavor and quality. This is known as the Patten. It so far has appeared to be perfectly hardy in northern Iowa and regions much farther north than this. This variety is now handled by many nurserymen.

Saves Hog Producers Millions of Dollars. Thousands of farmers have followed the demonstrated methods of feeding hogs worked out by the College. Iowa feeds from 8 to 13 millions of hogs yearly, therefore a saving of only \$1 in the cost of feed per hog would mean a saving of from 8 to 13 millions of dollars annually.

Informs on Household Equipment and Arranging Kitchens. Through radio talks and correspondence the College gives results of laboratory testing of various labor-saving household equipment. In addition it prepares and distributes plans for rearranging of kitchens to save time and strength of homemakers.

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