Third annual report

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IOWA AGRICULTURAL COLLEGE,
AMES, IOWA, NOV. 1, 1890.

To His Excellency Horace Boies:

I have the honor to submit herewith the third annual report of the Iowa Agricultural Experiment Station as required by law.

THIRD ANNUAL REPORT.

A large share of the Director's time last winter was occupied in work at farmer's institutes; stock meetings, and horticultural meetings in different parts of the state, and in preparing for the Station work of last summer.

We hauled 420 loads of manure last winter from Ames to the poorest parts of the Experiment Station grounds. The sowing of the different kinds of grain and grass seeds was the first field work which was performed last spring. Some of them were sowed early and others late. On a part of the plats they were planted thick and on others thin. And the preparation of the plats for the seeds varied much, as a part of them were plowed nine inches deep; while others were plowed only four inches, and a few of them were only well scratched with cultivators and harrows at seeding time. The number of kinds of grain which we planted were as follows: Oats thirty; spring wheat nine; barley eight; rye two, and field peas two. For the purpose of finding better fodder plants than many of the common kinds if possible, we planted twenty four kinds of field and garden bush beans, and twenty one kinds of peas; but the beans proved partial failures on account of drought, and the peas were ruined by rust. We planted five of the best kinds of dent corn and an equal number of varieties of sweet corn; as well as dent and sweet corn which was obtained by crossing kinds which had the most desirable characteristics in 1889. We planted also for trial fifty two kinds of potatoes, and many different varieties of sorghum, sugar beets, mangolds, carrots, tomatoes, etc.

Early in the spring we planted a large collection of grass seeds from India and the northern part of Germany, as well as some untried grasses of this country. In September we
sowed thirteen kinds of promising new winter wheats. At the proper season, we cross-fertilized many hundreds of blossoms of hardy Russian apples and native plums with pollen of the best American winter apples and tame plums. Later in the season we tried many experiments with fungicides and tried also, the making of hay by a new method.

For fuller reports of results, see our Station Bulletins 9, 10 and 11. In September, we built a cheap twenty eight ton silo (air tight) and filled it with Amber cane properly cut. Earlier in the season, we erected a substantial dwelling house of moderate size for the use of Experiment Station help.

As our station did not have domestic animals which could be used in conducting experiments, cattle were purchased last June for such purposes as follows:

One Cruikshank Short Horn bull from John McHugh of Cresco, Ia.; one Red Polled bull and two Red Polled heifers from S. A. Converse of Cresco, Ia.; two Black Polled Angus heifers from Archie Reid & Bro., Cresco, Ia.; one Holstein heifer from W. C. Nichols & Son of Cresco, Ia.; one Cruikshank Short Horn cow and one Holstein cow and heifer from W. M. Fields & Bro. of Cedar Falls, Ia.; one Holstein bull from Smiths, Powell & Lamb of Syracuse, N. Y.; one Galloway bull and heifer from E. R. Hardy of Abingdon, Ill.; one Black Polled Angus bull from E. B. Hardy of Abingdon, Ill.; and four Jersey heifers from Richardson Bros. of Davenport, Ia. One Jersey bull calf was donated to the Iowa Agricultural Experiment Station by Maj. H. E. Alvord, director of the Maryland Experiment Station and one Short Horn heifer was donated also by J. J. Smart of Dakota, Humboldt Co., Ia: All of the animals are of the best quality and their pedigrees are faultless.

The work done in the Department of Chemistry during the past two months may be summarized as follows:

Analysis of over fifty samples of grasses and grains; nearly half of them were samples of a few varieties only, taken at different stages, to show changes of composition during growth. Mostly published in Bulletins 10 and 11.

Analysis of 260 individual canes of sorghum, for selection of seed. Not published.

Analysis of a few samples of potatoes and mangels. Not published.
A joint experiment with Mr. J. M. Daniels of Dayton, Webster County, Iowa, in making sweet cream butter, and in comparing the keeping qualities of butter made from sweet and from ripened cream. Published in Bulletins 9 and 11.

Developments of a method for enabling creameries to purchase milk on its butter value with much less labor and expense than heretofore required. Published in Bulletin 9 (under title "The Relative Value Plan") and in Bulletin 11 (under sub-title "The Composite Samples").

Invention of a new form of the Iowa Station Milk-Test, especially suitable for creameries. Published in Bulletin 11.


Miscellaneous work, including analysis of milk and butter samples for the State Dairy Commissioner; analysis of three samples of alleged poisonous cheese for tyrotoxicon, (with the result of finding none); examination of clays, rocks and minerals for several citizens of the State. Results of this work were reported to the individuals, and will not be published. To the above may be added the answering of scores of inquiries by letter, on dairy matters chiefly.

Finally, there have been calibrated and tested as to accuracy of graduation, in the chemical laboratory of the station about 1500 milk-tubes used for testing milk by the method which bears the station's name.

The work in the entomological department has been spread over considerable ground. It is the plan, each year, to single out a few lines of work that shall be given special attention and at the same time to be ever on the watch for an opportunity to make any observation or experiment that promises to advance our present stock of knowledge in the line of economic entomology. As fast as sufficient facts are accumulated upon any subject to make it seem best they are published in the station bulletins.

The one line of work, which, more than any other, was singled out to receive special attention the past summer was the arsenic experiments reported upon in Bulletin 10. Next to the arsenic experiments, the cut-worms and the cut-worm moths have received most attention looking forward to a monograph of these most injurious insects. The worms have
been extensively gathered and reared to maturity, and much valuable data has accumulated in regard to food plants, life-histories, parasites, diseases and certain life-habits of special economic importance. It is thought best to carry this work through another year before giving results to the public in a bulletin.

Other insects receiving special attention are the following:

Plum Curculio and Plum Gouger: Important points in regard to egg-laying and other life habits before unknown.

The Scurvy Bark-louse, (*Chionaspis furfur*): Experiments to determine the best remedies and the most effectual time to apply them and observations upon insect enemies.

The Codling Moth, (*Carpocapsa pomonella*): Experiments to determine actual protection obtainable from the application of arsenites, the effects upon the two broods being kept separate.

The Cabbage Worm, (*Pieris rapae*): Experiments to determine best remedies, and observations upon parasites and bacterial disease.

The Potato Stalk-weevil, (*Trichobaris trinotata*): Collecting facts and making observations in regard to the presence of this insect over the state and the discovery of, at least, one insect enemy.

The Box Elder Cecidomid, (*Cecidomyia negundinis*): Habits of this species determined and the scientific description prepared and read before the Iowa Academy of Science.

Many experiments were also conducted early in the season to determine the best methods to prevent squirrels from taking corn.

Kerosene emulsion and Pyrethrum have been experimented with to determine certain points in regard to their uses as insecticides. A considerable time has been consumed, as must always be the case, in answering correspondence by letters to private individuals or through the columns of the agricultural papers of the state.

Such time as could be spared from other work has been given to collecting, arranging and determining insects to build up the Station collection, and a show collection of 500 insects of economic species has been arranged and fully labelled for the Iowa State Horticultural Society, and is at present on exhibition in the rooms of the Society at the State Capitol.
FINANCIAL STATEMENT.

THE IOWA AGRICULTURAL COLLEGE EXPERIMENT STATION

In Account with the

UNITED STATES APPROPRIATION.

Receipts.

1889-90.

Amount received from United States Treasurer, as per appropriation for the year ending June 30, 1890, under Act of Congress approved March 2, 1887.................................................... $15,000.00

Amount received from the sale of stock and produce belonging to the station................................................................. 631.81

Total receipts.................................................................. $15,631.81

Expenditures.

1889-90.

Paid for Buildings.—

On the improvement and repair of the station building............... $537.77

On the erection of a laborers cottage for the station................. 212.23 $ 750.00

Paid for Salaries.—

Director................................................$ 2,200.00

Chemist................................................. 2,000.00

Entomologist........................................... 1,600.00

Assistant to Chemist (part of year).... 159.73

Treasurer............................................... 250.00 6,239.73

Paid for Labor.—

General field and office work.............. 1,370.79

Paid for Apparatus and Library.—

Office fixtures......................................$ 64.40

Books, periodicals and binding............. 296.34

Apparatus for laboratories.................. 228.71 599.45

Paid for Equipments—

Machinery...........................................$ 547.75

Tools................................................. 92.85

Thoroughbred cattle........................... 2,800.00 3,440.60

Paid for Supplies and Expenses—

Traveling Expenses of Director.............. $206.79

Traveling Expenses of Chemist............. 28.75

Traveling Expenses of Entomologist........ 19.52

Expenses of helper at fair.................. 12.50

Mileage and per diem of committee......... 284.45

Interest on borrowed money................ 80.71

Carrying the mail................................ 50.00

Rent of land........................................ 200.00

Feed and care of horses and mules.......... 158.93

Seeds, trees, etc................................. 105.16

Supplies for laboratories.................... 215.14
Supplies for field experiments and
propogating house...................  116.41
Supplies for office......................  71.93
Coal and gasoline.....................  282.89
Freight and express...................  391.36  2,224.54

Paid for Bulletins.—

Printing of same.....................  1,016.70

$15,631.81  $15,631.81

I hereby certify that the foregoing statement is a true copy from the books
of account of the Iowa State Agricultural College.

HERMAN KNAPP,
Treasurer.

We, the undersigned, Auditing Committee for the Board of Trustees, certify
that the above is a correct statement of moneys received, labor performed,
purchases made and necessary expenses incurred for the Iowa Agricultural College Experiment Station for the year ending June 30, 1890.

W. I. CHAMBERLAIN,
E. W. STANTON.
Auditing Committee.

I hereby certify that Herman Knapp is the Treasurer of the Iowa State Agr-
cultural College, and that the above is his signature.

W. I. CHAMBERLAIN,
President of the Iowa State Agricultural College.