BULLETIN NO. 11—NEW SERIES.

SEPTEMBER, 1888.

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The first nine bulletins issued in the new series are now nearly out of print, and copies cannot be supplied.
HORTICULTURAL DEPARTMENT.

EMMETT S. GOFF.

BULLETIN NO. 11 - NEW SERIES.

INTRODUCTORY.

The bulletins now being issued are intended to meet a very natural and proper desire among the farmers of our state to know in what departments of work the Station force is engaged. The experiments outlined are for the most part now in progress, hence results cannot be given. These will be given in due time, either in future bulletins, or in the annual reports of the Station.

1. EXPERIMENTS IN CULTIVATION.

4. THE INFLUENCE OF THOROUGH AS CONTRASTED WITH SLACK CULTIVATION ILLUSTRATED.

This experiment is to be continued through a term of years on the same plats—fourteen in number, containing one-twentieth acre each.

The plats are all to be plowed at the same time and in the same
manner; plat $a$ to receive no harrowing, $b$ to be harrowed well once, $c$ twice, $d$ three times and so on up to $g$, which will be harrowed six times. Then the order will be reversed; $h$ being harrowed six times, $i$ five times, and so on, the last plat ($n$) not being harrowed at all. The plats, on which the crop will be varied from year to year, are to be treated in other respects alike, and the yields compared.

B. CULTIVATION OF CORN.

a. The effects of root mutilation considered alone.

Last season, it appeared* that cutting the roots of young corn plants to the extent accomplished by thorough cultivation, without the collateral effects of stirring the soil, reduced the yield more than twenty bushels per acre. This experiment is being repeated on two one-twentieth acre plats.

b. Cultivation with respect to root mutilation.

In this experiment it is assumed 1st, that root mutilation is injurious, and 2d, that the more the soil is worked without mutilating the roots, the more favorable will be the effect upon the plants.

Acting on this assumption, the ideal method of cultivation will be to cultivate the soil very shallow wherever it contains roots, and deeply where it contains no roots, in order to favor root growth to the utmost.

In order to eliminate in a great measure the influence of soil inequalities in different plats, in this, as in other experiments where practicable, adjacent drills are contrasted, rather than adjacent plats. The drills are planted upon plats of definite size for the sake of convenience.

This experiment is carried out in three duplicate series, each of which covers four one-twentieth acre plats. The plats each contain eight drills four feet apart, and an additional drill is planted between each two plats. As each drill to be considered in the ex-

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*Report New York Agricultural Experiment Station for 1887, p. 93-94.
periment must be cultivated on both sides, only every alternate drill is available.

The plats will receive two cultivations; the first being given when the tips of the leaves, raised erect, are about four inches high, and the second when they are about twenty inches high.

First series—Surface cultivation contrasted with ordinary cultivation.

The second and sixth drills of each plat receive no other cultivation than that furnished by the garden rake and the necessary pulling of weeds.

The spaces on either side of the fourth and eighth drills are traversed twice in a place with an iron frame, steel-toothed cultivator, working as close to the plants as possible without injuring the stems or foliage.

Second series—Surface cultivation contrasted with ideal cultivation.

The second and sixth drills receive only surface cultivation as in the first series. The fourth and eighth drills are cultivated with the corn plow and garden rake. In the first cultivation the corn plow is passed four times through the spaces between the drills taking care that it comes at no time nearer than eight inches to the drill. At the second cultivation the plow is passed twice between the drills, keeping carefully at the center of the spaces. After each cultivation the surface is raked level, and on the part undisturbed by the plow, the crust is broken and pulverized with the rake.

Third series—Ordinary cultivation contrasted with ideal cultivation.

The second and sixth drills receive ordinary cultivation as in the first series and the fourth and eighth drills ideal cultivation as in the second series.

C. THE INFLUENCE OF CULTIVATION UPON SOIL MOISTURE.

A one-twentieth acre plat is subdivided into ten small plats of
equal size. On two of these plats the soil is left undisturbed except to pull the weeds. On a second pair the surface is raked over after every rain that is sufficient to puddle the surface. A third pair has the surface pulverized two inches deep after every rain and a fourth four inches deep. The fifth pair has the surface mulched one inch deep with oat straw.

Once each week a sample is taken to the depth of a foot from each of the ten plats and dried at 212 ° F. to determine the moisture. Each sample is then washed through a sieve of ten meshes to the inch and the parts which do not pass the sieve dried and their weight deducted from that of the fresh and dried sample.

2. EXPERIMENT IN ROOT GROWTH.

THE INFLUENCE OF DEPTH OF TILLAGE UPON THE DEPTH OF ROOTS.

Five small plats are worked to different depths; the first to the depth of two and a half feet, the second two feet, the third one and a half feet, the fourth one foot, and the fifth six inches. All are planted with Waushakum corn. After the plants have attained their growth the roots of sample hills on all the plats will be washed out to ascertain their average depth.

3. EXPERIMENT WITH FERTILIZERS.

THE FERTILIZING VALUE OF SWAMP MUCK SUPPLEMENTED BY COMMERCIAL PHOSPHORIC ACID AND POTASH, AS CONTRASTED WITH THAT OF STABLE MANURE.

This experiment is to be carried on through a series of years. Two series of plats were selected that have been similarly treated since the establishment of the station. One of these receives a moderate dressing of well rotted stable manure, and the other a moderate dressing of swamp muck supplemented by as much phosphoric acid and potash in commercial forms as is contained in the stable manure. The muck is supposed to supply the nitrogen and the lightening quality to the soil furnished by the humus of the manure.
4. EXPERIMENTS WITH INSECTICIDES.

A. SALT FOR ROOT-INFESTING INSECTS.

Common salt to be applied in solution to the roots of plants attacked by maggots, as the cabbage and radish, making the application sufficiently early so that the roots may have time to absorb a portion of the salt, if they are capable of doing so.

B. POTASSIUM SULPHIDE FOR ROOT-INFESTING INSECTS.

To be applied in solution at the rate of an ounce of the sulphide to a gallon of water, pouring a tablespoonful about the stem of each plant.

C. KEROSENE ATOMIZED DIRECTLY WITH WATER.

To be accomplished by the use of a special apparatus whereby the kerosene may be reduced to a fine spray in connection with water, and applied without the use of an emulsion.

D. PARIS GREEN CONTRASTED WITH LONDON PURPLE AND THE "ZOEKTEIN"* POISON FOR THE CODDLING MOTH.

All to be applied with water as above noted.

E. LONDON PURPLE FOR THE PLUM CURCULIO.

The poison to be applied with water by means of the spraying pump and hose.

F. THE BEAN PLANT AS A REPELLENT FOR THE STRIPED BEETLE.

Seeds of the common garden bean to be planted with those of the squash and other cucurbits as a preventive of injury from the striped cucumber beetle.

5. EXPERIMENTS WITH FUNGICIDES.

A. POTASSIUM SULPHIDE FOR THE GOOSEBERRY MILDEW.

The foliage to be sprayed with a solution of half an ounce and smaller amounts of the sulphide to a gallon of water, the applica-

*See Report New York Agricultural Experiment Station, 1887, p. 98-99.
tion to commence as soon as the leaves appear, and to be repeated after every hard rain until mid-summer.

B. POTASSIUM SULPHIDE AND CALCIUM SULPHIDE CONTRASTED WITH HYPO SULPHITE OF SODA FOR THE APPLE SCAB.

To be applied in solution by means of the spraying pump. The applications to be made on the same day and on trees of the same variety, leaving half of each tree unsprayed as a check, and to be repeated after every hard rain until mid-summer.

6. EXPERIMENTS WITH THE POTATO.

A. THE USE OF FERTILIZERS ABOVE AND BELOW THE SEED.

The experiment to cover four one-twentieth acre plats, each plat to contain eight drills four feet apart, the first, third, fifth and seventh drills in each plat to be planted with the fertilizer placed below the seed tubers; the remaining ones to have the fertilizer placed above them. In the first series, the fertilizer is to be strewn in the bottom of the furrow; in the second the seed tubers to be placed in the bottom, covered with an inch of soil, over which the same amount of fertilizer is strewn.

B. IS CUTTING THE TUBER DETRIMENTAL?

Experiments made in 1886* and 1887 indicate that small whole tubers for seed yield as much as cuttings of the same weight from large tubers.

As a final test, thirteen one-twentieth acre plats are devoted to this experiment. Each plat contains eight drills four feet apart, of which the first, third, fifth and seventh are planted with whole tubers, and the remaining ones with cuttings from larger tubers, the average weight of the cuttings and whole tubers in each successive pair of rows being precisely the same.

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*Report New York Agricultural Experiment Station, 1886,p. 151-153. 1887, p. 86-87
C. SPROUTED, CONTRASTED WITH UNSPROUTED SEED TUBERS.

a. A Field Experiment.

The experiment to cover four one-twentieth acre plats, each containing eight drills four feet apart. The first, third, fifth and seventh drills in each plat to be planted with seed tubers that have already formed shoots an inch or more long, the remaining ones with those that have formed no shoots. The seed tubers were selected very early in spring before the shoots had commenced to form. The average weight of the tubers to be planted in each successive pair of drills was precisely the same. The seed tubers for one of each pair of drills were then placed in the greenhouse to form shoots, while those of the remaining drill were placed in a cool part of the cellar, where the eyes did not start.

b. A Laboratory Experiment.

As collateral to the above test, an experiment has been conducted intended to show how much, if any, of the stored nutriment of the seed tuber is consumed by the shoots that form in a warm cellar, previous to planting time.

D. DOES REMOVING THE SEED END PROMOTE EARLINESS?

On two one-twentieth acre plats, each containing eight drills, a comparison is made between the date of maturity of tubers from which the seed end was removed at the time of planting, and others from which an equal amount was removed from the stem end, the tubers being of equal weight at the beginning.

E. DOES EXPOSING THE TUBES TO THE LIGHT, FOR A TIME BEFORE PLANTING, PROMOTE EARLINESS?

This experiment is made on three one-tenth acre plats. The date of maturity of C plants grown from seed tubers that had been placed on the floor of a light room until the eyes had commenced to start is compared with that of others kept in a dark cellar until
planting time; the two series of tubers weighing the same at the commencement

F. THE INFLUENCE OF TREATMENT UPON VIGOR.
  a. Is the influence of soil hereditary?

The yield of tubers grown last season on very poor soil is compared with that of others grown on rich soil, the experiment to be continued through a term of years.

b. Is the increased vigor due to selection of seed tubers from the most productive hills* cumulative through successive years?

The yield of seed tubers taken from the most productive hills of last season is compared with that of tubers of equal weight taken from the least productive hills, the same selections to be continued through a term of years.

G. WHY IS THE NUTRIMENT OF THE SEED TUBER REMOVED MORE RAPIDLY ON RICH THAN ON POOR SOIL†?

On a plat of very poor soil planted to potatoes, a part of the hills is mulched with a layer of washed sand two inches thick, while the others are left unmulched. If the nutriment is removed more rapidly from the seed tubers of the mulched hills, it will be evidence that it is a dearth of moisture that retards the utilization of the nutriment on poor soil.

7. EXPERIMENTS WITH SORGHUM.

A. THE INFLUENCE OF SELECTION UPON THE SUGAR CONTENT.

With the view of increasing the sugar content, the per cent. of sugar in the juice of many individual plants will be determined, and seed will be gathered for planting only from those plants that show the highest sugar content.

B. THE INFLUENCE OF SPECIAL FERTILIZERS UPON THE SUGAR CONTENT.

Numerous small plats are fertilized with various fertilizers

*See Report New York Agricultural Experiment Station for 1887, p. 82-86
†See Report New York Agricultural Experiment Station, 1886, p. 158-159, Agricultural Science, II p. 27.
separately and combined, and their influence on the sugar content of the juice will be determined.

C. A TEST OF VARIETIES.

There are being grown upon the experimental plats over one hundred and fifty named varieties of sorghum all quite new to this country with the exception of a few well known standard varieties which are grown for purposes of comparison.

It is hoped that several of these new varieties may prove to be especially valuable as forage plants or for use in the silo, if not for the production of syrup, sugar and seed.

In addition to the experimental work noted above, the usual tests of varieties in fruits and vegetables are being carried on, and the investigation of the potato scab, commenced last season by the assistant horticulturist, is being continued by him.

The investigations upon the physical properties of soils in progress last year are also being continued.