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receive from the general public. Of almost equal importance to the work being done by the men whom we have mentioned, and others like them, is the interest being given to practical farming by the young men of wealth and station. Instead of going into the professions, as has been the custom, many are adopting farming. The time has gone by when the father educated his most promising sons for the learned professions, and considered farming good enough for the most stupid. Some of the brightest have gone into agriculture, and will continue to do so. As we have frequently stated, the time has come when, to compete with the world, the best system, the wisest methods and the utmost intelligence is required in our agriculture. We cannot increase the number of acres in the United States, but we may augment the amount of products raised from them; indeed, we may double it by intelligent farming, and by intelligent farming only.

J. H. R.

NEW YORK AGRICULTURAL EXPERIMENT STATION.

The New York Agricultural Experiment Station, although established but a few months ago, begins to show results worthy of the great State for the benefit of whose farmers it was organized. Under the wise and progressive management of its Board of Control and the Director, it is fast developing into one of the most practical and useful institutions in the country, and it promises the most beneficial results to the agriculture of the State. While the Station is conducted purely in the interests of the farmers of New York, yet it will, despite of this, prove vastly beneficial to the agriculture of the whole country, for its work cannot be limited in its effect.

The Station is located at Geneva, New York, on the Auburn branch of the New York Central Railroad, about one hundred miles east of Buffalo, and three hundred and eighty west of New York, in one of the oldest agricultural districts in the State, and surpassed by none other in the natural fertility of the land and profitable cultivation. Indeed, it is one of the richest and best developed sections of the whole country, and the Station has therefore to compete with the best, while having for its neighbors the sharpest critics of farming. Grain and fruits are the leading products of the country about Geneva, which is one of the principal nursery centers of the United States, thousands of acres being employed in the business in the immediate vicinity.

The farm of the Station contains one hundred and twenty-five acres, every rood of which, except the banks of a valuable brook running through the place, is tillable. It was formerly a dairy farm, and in all respects it is as good a place for the purpose to which it is devoted and as desirably located as any that could have been selected. The gentleman from whom it was purchased spent large sums on the land and buildings, so that the price paid for it by the State, $25,000, was very low. Indeed, the owner would not have parted with it for the sum he did for any other purpose. The land is clay, and susceptible of the highest development, and, like the
surrounding country, is rolling. There is an orchard of 673 apple, 97 peach, 77 pear, 37 cherry and 28 plum trees, all of selected varieties of fruit. All are young, thrifty, bearing trees.

The object of the Station is to determine what are the best systems to follow in agriculture and to show the best methods of culture. The necessity for this kind of work is becoming more and more apparent to thoughtful and observing men each year. Considering how fast the population of our country is gaining, not only through emigration, but also through the natural increase in a people now numbering 50,000,000, and recognizing the fact that competition from the West by the opening of new fields and lessened rates of transportation, implies necessity for the largest returns from the limited acreage and impoverished soil in the East, the necessity for skilled farming is coming to be more and more realized. Moreover, the wants of the farmer are constantly becoming greater as civilization advances. All classes require more than did our forefathers, and the farmer wants increased comforts, lessened labor and more enjoyments. His products meet a better demand, and will have a still greater one, so that he must produce more to meet the world's wants and supply his own. As we have argued for some time, and indeed the Association which this journal represents and the publication itself were founded mainly to encourage this idea, that we must produce greater crops from the same acreage. This, for the benefit of the whole country, and for the benefit of each individual farmer, is the most important of questions to be studied and acted upon. It is for this reason that we hail with so much satisfaction the establishment of Experimental Stations; that we appreciate so highly the work of Agricultural Societies, the outcome of scientific thought and practice, and agricultural journalism. How is the result to be achieved? It must of necessity be a slow process, but it will be accomplished through these instrumentalities, and each and all should receive the best encouragement from all classes, and the State and National Governments will promote their own best interests by lending their help. There exists a need for experiment, and a necessity for the greatest knowledge of conditions affecting agriculture.

What are the steps to be taken, it may be asked. We may formulate this plan: 1st. Determining the value and use of seed; and we adopt Dr. Sturtevant's view, that the fundamental principle of successful agriculture is good seed. 2d. Physical conditions of the soil, including drainage. 3d. Fertilization. 4th. Cultivation. 5th. The value of each factor in their inter-relations. It is because the New York Agricultural Experiment Station will be conducted so as to ascertain by experiment and test the best methods, and because it is so organized and so managed to do the best work in each department, that we regard it as one of the most useful, if not the most useful, institution of its kind in existence.

The purpose of the Station, as defined by the Director, is to investigate agriculture from the standpoint of practice, and, while not ignoring the studying after new facts, show the farmers how to overcome the difficulties which are inseparable from his pursuits. It will also seek to illustrate to the farmer the value of intelligent farming. The theory of the Station embraces two essentials: first, the experiment; second, the test. Until the power of verification be acquired, agriculture can lay little claim to being a science. This is the foundation stone of Dr. Sturtevant's work. The first difficulty the farmer meets is in the quality of his seeds, because of the trouble of getting a good article, even if such exist. The first work of the Station will include an endeavor to ascertain the amount of cultivation which can be advantageously practiced under different conditions of fertility and seed,
and the amount of fertilizer which can be profitably applied under different conditions of culture and seed. Manure is often used beyond the power of the seed to produce. No scientific experiments are made as such; but science is availed of to secure accurate data for practical experiments, and to throw light upon the problems of practice.

The work of the Station this year has been necessarily circumscribed, having only been begun in March, when everything in the way of preparation was yet to be done. There was enough connected with the organization and arrangement of such an institution to consume a year's time, but practical work has already commenced. This year it is confined, as previously written, to seed, cultivation and fertility in their inter-relations. Five acres are devoted to experiments with corn, three to forage, one and a half to wheat, two to potatoes, two to garden vegetables, and three to summer fallow for next year's wheat tests. In spite of the obstacles against him this year, the place being in complete disorder when the Director took charge, and although lacking knowledge of the soil, he has laid out and put under progress a quite extensive line of experiments, which, in casual conversation, he itemizes as follows:

In the corn experiments, the idea is to study the relations between seed and varying quantities of manure and methods of cultivation. For this purpose, four series of five plats of one-tenth acre each are laid out; the half of each series receives cultivation, the remaining half having the weeds destroyed by hand or by shallow hoeing. Each series of five plats is manured alike, viz.: No. 1, no fertilizer; No. 2, 200 pounds; No. 3, 400 pounds; No. 4, 800 pounds; No. 5, 1,000 pounds of fertilizer per acre. The question asked is whether the amount of fertilizer used will have a different effect upon the different qualities of seed planted, and whether cultivation varies the prolificacy of the seed under the circumstances of no manure, little manure, much manure, and excessive manuring.

In other plats other questions are asked. In one, what is the influence upon the crop of selecting corn from the same bin, selecting in one direction for good quality, in the other for bad quality, taking care only to have the kernels of equal appearance? In another plat two ears of corn are diagrammed on the field, each kernel keeping in the field the relative position it held upon the ear. In other plats thin and thick planting are practiced, varying from hills five feet apart at one extreme down to one foot apart at the other. In another plat depth of planting has been tried, varying from one-fourth inch, one inch, two, three, etc., to eight inches deep. In another series the effect of excessive manuring upon quality of the crop, and upon another the effect of cultivation in changing the effect of over-manuring.

In other plats root pruning of great severity is being tried in an endeavor to raise the largest practicable crop. In other plats are experiments upon stolen crops, viz.: beans with corn and pumpkins with corn. Adjoining the corn plats are planted six plats of sorghum which have received potash at the rate of 200, 400, 600, 800 and 1,000 pounds per acre, in order to test the influence of potash upon the sugar in this plant.

The potatoes have been put in in two sections—one section to be left undisturbed until harvest, the other section to be dug at various intervals during growth, in order to study into the conditions which affect the formation, growth and development of the tubers. In the diggings up to date the results have been uniformly illustrative of a new fact, viz.—that the method of cutting the seed is a very important factor. Seed so cut as to include the whole depth of the eye within the substance of the potato have yielded uniform results, and results far superior to
those gained from whole potatoes; potatoes cut in the ordinary way, or single eyes, cut haphazard. Potato sprouts up to June 12 gave most favorable results, being
ahead at that date in the formation of tubers to potatoes planted in any other way.
They then took a period of rest, and allowed all the other methods of planting to become superior. The following bulletin on this point, just issued by the Director
of the Station, details one of the most useful and valuable experiments yet made with the potato. It shows that a discovery has been made in preparing the seed which
will prove of the utmost value to every farmer who grows this vegetable:

N. Y. AGRICULTURAL EXPERIMENT STATION, GENEVA, N. Y., JULY 20, 1882.
BULLETIN NO. II.

In commencing the series of experiments upon the potato crop it seemed to us
to be necessary to study the underground processes with even more attention than
we should give to the tops. The results at date seem to justify this method. In
order to secure still further assistance in understanding the meaning of what we
should observe in the field, we, as early as March, started into growth potatoe plants
in earth, in sand, and in water in glass vessels upon the mantle in the office. In
the field five varieties, the early rose, the snowflake, Burbank's seedling, beauty of
Hebron and early Ohio, were used to form the unit of our system, and were planted
in rows of one hundred hills each on manured and unmanured soil. The seed used
was cut in various ways and planted both for level and ridge culture. In the garden,
duplicate plats were planted for the purpose of furnishing plants to be dug at
various intervals during the growing season. In these garden plate the early rose
variety alone was used. Some rows were planted with potato peelings, others with
single eyes cut small, single eyes cut larger, single eyes cut still larger, half
potatoes, whole potatoes, seed ends, stem ends, and potatoe sprouts, under various
circumstances of level and ridge culture. Some portions have been left undis-
turbed by the hoe, others hoed, others spaded, others mulched, etc., etc. Our first
observations were to note the variation which was apparent between the vegetating
of the various plats. Some were not only earlier in vegetating than others, but
were also more uniform in the appearance of the plants. As soon as growth was
well established we commenced digging up hills for the examination of the under-
ground portion, and from this date until the present our observations have all
harmonized with each other, and the conclusions at first arrived at as the record of
the first examination have been in general substantiated and strengthened. We
found that at no time has there been any definite relation between the appearance
of the tops and the tuber formation at the roots. At no time could we ever feel
certain that abundance of top meant abundance of earliness of tuber, or that small
tops meant a deficiency of tuber. This conclusion is an interesting one, in view of
the fact that upon the manured and unmanured portions of the field planted with
varieties at no time has there been any appearance of superiority of the manured
over the unmanured portion. Judging from the tops alone, we might say, as many
of our visitors have said, the unmanured portion of the field shows a decided
superiority over the manured portion.

Our earlier diggings showed the earliest and largest formation of tuber upon
the plants derived from the shoots which were broken from the potatoes and cov-
ered as seed. This fact held good up to June 13th, when growth seemed to cease
and other plats took the precedence. Continued examination also gives origin to
the following statement of results: In every case the eye cut small produced later
formation of tuber and fewer and smaller tubers than other seed used. In the sin-
gle eyes cut larger we noticed an increase in earliness and prolificacy over the eye
cut small. In the eye cut large and deep we obtained the greatest uniformity of
plant and the earliest, largest and most abundant supply of tubers to the stalk. In
those cases where half potatoes, split lengthwise, were used as seed we noticed a
lack of uniformity in the product of the different hills, and examination has shown
that where the vegetating eye was shortened in its depth, the yield was markedly
inferior to that produced from the corresponding half of the potato where the vege-
tating eye was left at its full depth. These observations led the way toward a study
into the reasons which produced these differences, and opened the question whether
by the method of cutting the seed we could influence the results of planting. In
our first search after causes we split potatoes lengthwise and tried to trace whether the eye penetrated the tuber, and to what depth—which we were led to think might be the case, from observing that in the seed taken from the growing plant the absorption of substance seemed to follow definite lines—but although our conclusions became satisfactory to ourselves, yet this method did not allow the demonstration of our assumed facts to others. We, therefore, by soaking slices of potatoes in carmine, succeeded in bringing out the interior structure through the staining of the tissues. This distinctly exhibited the tuber as a swollen stem, each eye being a terminal bud on a branch, the branches running into a central stem. We thus were able to assign a difference in the character of the seed used, whether cut with reference to the quantity of potato substance, or whether cut with reference to securing length of the stem enclosed with the potato substance.

Whole potatoes used as seed seemed to give us results which were puzzling in their character. In some hills but few eyes developed, in other hills a multiplicity of eyes and a forest of shoots. For some time this fact seemed to admit of no explanation, but in attempting to destroy the vitality of eyes by boiling water and observing that these injured eyes threw up shoots in great abundance, even to the limit of twenty-five shoots to an eye as an extreme, it seemed to us as if the injury to the eye of the potato, either before or during planting, was sufficient to account for the great increase in shoots, and it now seems quite probable that potatoes whose eyes are absolutely uninjured rarely develop more than two to four eyes, while other potatoes whose eyes have been injured in part may develop a dozen or more eyes. Wherever eyes are developed in excess, while the tuber formation may be large, yet the resulting crop of tuber, through deficiency of size, on ordinary land, seems small. One interesting fact connected with this experiment of pouring boiling water upon a pile of potatoes, is that it caused the formation of stems, underground stems, and tubers within the substance of the potato.

Should the result of these studies be verified—and here let us remind the public that completeness of information can only be derived from the union of the experiment and the test, and that thus far, while we have the experiment we are still lacking the test—the saving to the farmer in seed through the cutting theseed potato in a rational way, would not only be large in itself, but would also be accompanied by a probable increase in the quality and in the quantity of his crop. The present indications are that how the potato is cut for seed is of great importance, and that this is an essential factor to be considered by him who would gain the best results from his planting. The test, carried out another year, upon land of different degrees of enrichment, will give conclusive evidence of the efficacy of our experimental studies as applied to the conditions which prevail upon the farm.

E. Lewis Sturtevant, M. D., Director.

Having arrived at the Station too late in the season to attempt crops of cereals, the Director had to satisfy himself with putting in such varieties of oats, barley and rye as could be selected from the seedsmen's catalogues, in parallel rows, in order to study simply the difference between varieties and the habits of growth.

In the forage field he has planted fourteen varieties of sorghums, Chinese sugar cane, early amber cane, pearl millet, dhurra corn, vetches, corn, Chinese bean, teosinte, and eight varieties of cow pea, in order to study into the values of species and varieties of forage plants for dairymen. He has also put in eighteen plats of grasses, one of alfalfa, one of lucerne and one of soja bean.

In horticulture the season was entered upon too late to accomplish much except preparation. He has, however, put in two samples each of every variety of currant and American gooseberry offered in nurserymen'scatalogues, and all the varieties of blackberries and raspberries that could be obtained. He has set out nine varieties of grapes for trial, and, in addition, four wild species in order to obtain pollen for experiment in future years. In the garden he is making special tests of peas, beans and tobacco; of the former, twenty-nine varieties, of beans eighty-seven varieties, and of tobacco sixteen varieties. He is also testing the different varieties of cabbage and turnip, numerous varieties of beets, parsnips, carrots,
onions, squashes, etc. In addition to the practical uses of the Station, he has also put in a flower garden in order to give pleasure to those ladies who may favor the Station with a visit.

The wheat found upon the place upon entry has been staked off into plats and subjected to experiments, which include trampling, rolling and harrowing, obliteration of spaces, mowing, etc., but on account of the irregularity of the stand, caused by winter killing, but little result may be anticipated.

The Fall work will be devoted to a study of the rooting of crops. The plans for the Winter include the preparation of the cattle barn and the putting in of the facilities for accurate trials of cattle and foods in their relations to flesh and milk. The silo, built in a most substantial way, will be filled in September with corn fodder, and used in the Winter experiments on feeding, by which a thorough practical test of the value of ensilage will be made. Next year it is proposed to have fields in all the cereals and in mixtures of grasses.

The buildings of the Station are those usually found on a farm. The house, a fine structure, surrounded by a beautiful lawn, well shaded with beautiful trees, is 40x42 feet, with an "L" 17x34 feet, and has a covered piazza, metal roofed and iron-posted, 7 feet wide, extending around the whole. The house is three stories in height, with a basement, and is built of brick, and has a metal roof also. It is said to have cost $5,000 alone to introduce the water, which is conducted through a three-inch iron pipe a distance of two miles. On the first floor is the chemical laboratory, 40 feet by 17 feet 8 inches, to be fitted with every requisite for the chemical work of the Station, and it will be made most complete for its purpose. On the opposite side, in front, a hallway 10 feet wide separating the two, is the main office, 15x29 feet, which is used also for reception room and board meetings. This is to eventually serve also as a museum. Adjoining is a working office 12x15 feet, and used as a library, draughting and microscopic room. In the rear, connected with the two former rooms on the side opposite the laboratory in the "L," is the Director's office, 15x20 feet, containing his private library, papers, records, specimens, etc. In the basement of the building is another laboratory 11x26 feet, and a mechanics' room 14x29 feet. The second story is occupied as a residence by the Director, and there are comfortable apartments for his assistants in the story above. The outbuildings comprise a good carriage-house and stable, an ordinary barn of commodious size, a cattle barn having hay-loft overhead, and a stone building to be devoted to cattle experiments. The Governor of the State, Hon. Alonzo B. Cornell, whose name heads the Board of Control, has been friendly to the enterprise from its inception, and takes a personal interest in its management. To his efforts and support its inauguration and successful organization was largely dependent; and for his interest in this matter alone he deserves the gratitude of every farmer in the State. The President of the Board is Hon. Robert J. Swan of Geneva, one of the best farmers in the State, and whose farm has taken first premium as the best in the State. He is an ex-President of the New York State Agricultural Society, and one of the most popular men anywhere. The Secretary, General N. M. Curtis of Ogdensburg, is a leading agriculturist and a most efficient man. He also is ex-President of the State Society, and prominent as a cattle-breeder. The other members of the Board are Hon. Patrick Barry, the celebrated nurseryman of Rochester, and a man of great talent and wide reputation; W. A. Armstrong, Esq., editor of the Elmira Husbandman, and one of the ablest and best advocates of the farmers' interests we have; James McCann, Esq., of Elmira, a wealthy, public-spirited farmer, intensely practical and conservative, without being unprogressive; Professor S. W. Clarke of
Spencerport, a gentleman of high standing; Daniel Batchelor of Utica, a public man of note; Hon. J. S. Woodward of Lockport, the introducer of the Niagara grape, and a progressive farmer of much ability; and A. V. Mekeel, Esq., of North Hector, a first-class and influential farmer. The Director of the Station, Dr. E. Lewis Sturtevant, formerly of Massachusetts, is one of the well-known men in agricultural science, a graduate of Bowdoin College, and also educated at Harvard, where he took the medical course for the purpose of acquainting himself with physiological science. He has never practiced medicine, but has devoted his attention to the study of agriculture and the sciences pertaining to it. A practical chemist, an accomplished botanist, and a practical farmer himself, he knows the wants of farmers. He conducted a farm of his own for many years in Massachusetts, which he still owns and operates, and achieved a reputation in cattle-breeding, having secured the gold medal at the New York Agricultural Society’s Fair for his herd of Ayrshires. No one man has given more attention to the culture of corn, of which he originated a prolific variety, the “Waushakum,” and in 1880 he collected 347 varieties, which he donated to the botanical department of Harvard University. Dr. Sturtevant has made a special study of milk, and is the originator of the modern theory of dairying founded upon the milk globule. He has written largely on agriculture and kindred topics, and published several works of value. As a writer, he is a man of caution and exactness, and in his habits of thought a true investigator. He is enthusiastic in his new work, a fact which argues well for the success of the enterprise and for his own attainments. His selection for the important place was the best that could have been made. It was a proper recognition and creditable to the Board of Control, who, by that one act, showed their high appreciation of the work they had in hand.

Dr. Sturtevant is ably assisted in the work of the Station by the following gentlemen, selected because of their availability for their different departments: Assistant Director, Mr. H. H. Wing, a graduate of Cornell University; Horticulturist, Mr. E. S. Goff of Elmira; Chemist, Dr. S. M. Babcock, late assistant to Prof. Caldwell, Cornell University.

It is most gratifying to the writer to note that the Station is working in concert with Houghton Farm, the only private experiment Station in this country except that of the Rural New Yorker. It is owned by Mr. Lawson Valentine, who at his own private expense is aiming to do all the good possible for agriculture. Major H. E. Alvord, it will be remembered, is in charge of this Station. It will also co-operate, as opportunity offers, with the other experiment stations in this country previously mentioned in these pages.

The Directors and officers of the New York Experiment Station extend a cordial invitation to the farmers of the State to visit and inspect the work. They contend that by no other means can the Station accomplish so much good as through personal examination of its work and results by those interested in agriculture, and all visiting it may be sure of a warm welcome and the fullest information and most courteous treatment. We recommend all who can do so, whether living in the State or out of it, to visit the Station and examine its methods.

J. H. R.