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Agricultural Experiment Station

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CO-OPERATIVE EXPERIMENTATION.

Bulletins of this Station will be sent, upon application, free of charge,
to any Farmer in the State.

KNOXVILLE, TENNESSEE, U. S. A.

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THE AGRICULTURAL EXPERIMENT STATION

OF THE UNIVERSITY OF TENNESSEE.

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The Station has facilities for analyzing and testing fertilizers, cattle foods, milk and dairy products; seeds, with reference to their purity or germinating power; for identifying grasses and weeds, and studying forage plants; for investigating the diseases of fruits and fruit trees, grains and other useful plants.

The Station Bulletins and Reports will be sent, free of charge, to any farmer within the State.

Packages by express, to receive attention, should be *prepaid*.

All communications should be addressed to the

SECRETARY OF THE

AGRICULTURAL EXPERIMENT STATION,

KNOXVILLE, TENN.

 The Experiment Station building, containing its offices, laboratories and museum, and the plant-house and horticultural department, are located on the University grounds, fifteen minutes walk from the Custom House in Knoxville. The Experiment farm, stables, milk laboratory, etc., are located one mile west of the University, on the Kingston pike. Farmers are cordially invited to visit the buildings and experimental grounds.

Bulletins of this Station will be sent, upon application, free of charge, to any Farmer in the State.

CO-OPERATIVE EXPERIMENTAL WORK.

One of the purposes for which the Station was established is to test new species and varieties of plants, and so determine whether or not they have any value in themselves, and whether they can be grown upon the soils and under the conditions existing in this State. Certain species, as most of the cereals, grasses, and a large number of forage plants, have such wide adaptability to climatic influences as well as to soils, that they can be satisfactorily tested upon our grounds here; and we can, with confidence, recommend or advise against further attempts by others. With respect to plants of such character as can be grown profitably only on particular kinds of soils, or under conditions not general but local, it is necessary to make experiments in a large number of places and under widely differing circumstances.

That work of this kind may be done so as to be of real service to our people, experiments must be carefully undertaken, and just as carefully carried on to definite conclusions. Attempts which do not promise results of economic importance should not be made. Experiments of a purely scientific character, such as must be made under as perfect control of conditions as possible, and in pursuit of some specific inquiry, can best be undertaken by trained Station workers. Co-operative experiments may be carried on, very profitably for all concerned, without the extreme accuracy demanded for scientific research; but there must be a certain earnestness and spirit on the part of those who enter upon this kind of work, that such experiments may have any value whatever.

Upon the suggestion of Major Allison, Commissioner of Agriculture, that this Station co-operate with him in his endeavor to introduce a new agricultural product, the Station management readily undertook to perform its share of the work to be done.

About the first of April the Commissioner distributed, from the Bureau at Nashville, one pound packages of sugar-beet seeds, sending them to all sections of the State, accompanied by the following letter of advice and directions for planting and cultivation:

The sugar-beet seeds are distributed by the Commissioner for the sole purpose of ascertaining whether or not beets sufficiently rich in sugar can be grown on any of the soils of Tennessee. That we can grow large crops of beets, fifteen to twenty tons per acre, upon moderately fertile lands in almost any section of the State, has been frequently demonstrated. Beets for table use or for stock feeding are easily produced upon our average soils, and are largely grown for such purposes every year. It will probably be assumed by most of those to whom the seeds of the Vilmorin sugar-beet are now sent, that it is just as easy to grow sugar-beets as any other, and that methods by which they have grown the roots for domestic purposes will be equally successful in growing them for sugar making. *The Commissioner earnestly requests that the directions sent herewith be followed as closely as possible*, to the end that we may know, as quickly and as certainly as may be, whether or not any portion of Tennessee can in the near future furnish beets in sufficient quantity, containing the necessary per cent. of sucrose, to justify the erection of a sugar factory. Careful and painstaking effort on the part of those who have proffered their help in this series of experiments will very probably result in establishing a new and exceedingly valuable industry, to the advantage of the whole Commonwealth.

Directions for Planting and Cultivation.

Select for the purpose, land in fairly good condition, which has not been dressed with stable manure during the past year. Virgin soils, (newly cleared land), stiff clays, or garden plats very rich in organic matter, should not be chosen. "Perhaps the best soil may be described as a sandy loam; a soil containing a happy equilibrium between organic matters, clay and silica." The ground should be well drained, because the roots must have a deep, loose soil, so that the tap roots may penetrate the sub-soil and obtain the necessary moisture and food for the development of sugar.

If deeply plowed last fall, so much the better. If this has not been done, as soon as the land is in proper condition, plow deeply, eight or nine inches, with a turn-plow, following in each furrow with a sub-soil plow, six or seven inches deeper. Harrow and re-harrow until the surface is in perfect tilth. When ready for seeding, which is best done between April 20th and May 10th, or as early as garden beets are usually planted, harrow again, and if the soil is a rather loose loam it is best to roll the ground. Plant in straight drills, *upon the level surface*, eighteen to twenty inches apart. It is not desirable to raise heavy beets; those weighing twenty to twenty-four ounces have, as a rule, the largest percentage of sugar. Moreover, the rows are best somewhat close together, that the foliage may cover the interspaces during the dry season.

The drill-marks should be opened to such a depth as will allow of covering the seed one inch deep; drop three or four seeds together at intervals of not less than five nor more than nine inches; roll or otherwise firm the soil above the seed.

The soil having been freshly cultivated just before seeding, the

young plants will probably appear in advance of the weeds. It will be well, upon the small experimental plats, to mark the ends of the rows with small stakes; if the weeds appear before the beets, or at the same time, a line may be stretched between the end stakes, and the young weeds between the rows destroyed by the use of an ordinary steel-toothed garden rake.

Cultivation must be so managed as to keep down the weeds, and the surface soil between the rows open and porous. Very little hand work will be required upon large areas, if the weeds are kept down from the start; for the small plats of this experimental work the cultivation can be done by hand, or with any of the smaller one-horse cultivators in common use.

When the beets show four leaves, thin to one plant in a place, leaving the most vigorous plant, and using very great care not to disturb it when removing the others. If by any accident all the plants of the cluster have been pulled up, reset one of them instantly, carefully firming the soil about it, with care not to bruise either root or top of the plant. As soon as this thinning is completed, give the whole plat a thorough hand-hoeing. Cultivate between the rows at least once every ten days, or oftener if necessary to keep down the weeds. As the leaves begin to spread, use great care not to injure them; upon the uninjured and healthy development of the leaves depends the growth and quality of the beet. When the leaves shade the ground completely or very nearly, stop cultivation. If the work has been properly done, upon well prepared soil, no part of the beet-root should appear above the surface. If any of the root does show above the surface, draw up the soil around it without delay. Watch this carefully.

The results of the work of this year cannot, of course, be regarded as determining the question as to whether or not we can produce sugar-beets in Tennessee; but the information obtained will enable the Bureau to continue the experiments wherever probability of success may be sufficiently indicated to justify further trial.

To each grower, to whom seed is now sent, will be forwarded in due time full directions for taking and forwarding samples for analysis.

Each person to whom seed was sent was requested to sign and return a receipt as follows:

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Received of T. F. P. Allison, Commissioner of Agriculture, etc., one pound of sugar-beet seed which I agree to plant and cultivate as directed; to report results according to directions; to send, prepaid, six average beets, prepared and packed as instructed, to the Agricultural Experiment Station of the University of Tennessee, Knoxville, Tenn.

[SIGNED.]

About the same time there were sent out by the United States Department of Agriculture to correspondents of this Station, over one hundred packages of sugar-beet seed.

In August, Commissioner Allison sent to every person to whom the beet seed had been furnished for trial the following:

To Growers of Sugar-beets from Seeds Sent Out by The Bureau of Agriculture, etc., Spring of 1894.

The amount of sugar in beets increases rapidly as the roots approach the stage of ripening. We have no reliable data as to the season of ripening in this State; but this is probably somewhere between the 10th and 20th of September. The plantings made in February will be ready during the last week of August; while those planted in May will not be ready before the first or tenth of October.

Beets are ripe when the leaves change from a dark green to a yellowish green. They drop flatly upon the surface of the ground; many of them die. A drought may cause the outer circle of leaves to fall, but until the ripening stage of growth is reached the remaining leaves do not change their color. Ordinary frosts will do no harm.

The soil should first be loosened on each side of the rows, so that the roots may be lifted by hand.

The tops, or necks, of the beets selected for samples to be sent in for analysis should be cut off as soon as the roots are taken from the ground. With a large knife cut off that portion of the beet to which the stems of the leaves are attached. The object of this is to get rid of the mineral salts which are found in the top or neck of the beet.

Within a few weeks the sugar beets grown from the seeds sent out by the Bureau of Agriculture will be ripening for harvest. It is important that the roots intended for analysis shall be properly taken from the ground and carefully prepared for shipment as directed below.

Please observe the appended directions for taking and sending samples, and do not fail to give, as fully as possible, answers to the questions in the "blank report upon culture of sugar beets," herewith enclosed.

Very truly yours,

T. F. P. ALLISON,

Commissioner of Agriculture.

Direction for Taking and Sending Sample.

From the middle rows of the plat select six beets weighing not more than two pounds each, and preferably about one and a half pounds. Should most of the beets be very much larger than two pounds, send an average sample. Take them from various places, so as to represent the whole plat. Reject any which are not regular in outline and sound at the crown. Cut off the leaves, wash the roots, being careful not to bruise them, and wipe or drain them dry, but do not expose to the sun much. Wrap each beet carefully in paper which has been lightly greased with melted lard. Wrap the whole in strong paper and tie securely, or put in a light box of suitable size. Attach the enclosed tag to the package, and send by express. If neighboring farmers will pack together and send by freight, it will save expense. Be sure to fill out the blank for name of sender, or we can do nothing with the beets.

Name of Grower _____
 Post Office _____
 County _____
 Did you subsoil the plat? _____ If so, how deep? _____
 If not, how deep was the ground plowed? _____
 Describe kind of soil, briefly, including subsoil, and state whether
 soil has been manured, and if so, when _____
 State in a general way the distribution of rainfall during the sea-
 son, and whether the weather, as a whole, seemed to be favorable
 to the growth of the crop _____
 Variety of beet, if known _____
 Date of planting _____ Did the seed germinate well? _____
 Distance between rows _____ Distance between beets in rows _____
 Describe cultivation given _____
 If any insects or diseases have attacked the leaves or roots so as to
 attract attention, please describe them _____

The seasons during the year 1894 were not propitious. Crops of all sorts suffered by droughts of greater or less duration. Vegetables of all kinds failed to yield decent returns except in a few favored locations. From a considerable number of those to whom sugar-beet as well as other seeds had been sent came statements of this sort: "The beet seed did not germinate readily"; "were overgrown by weeds before large enough to cultivate"; "were attacked by insects which destroyed the foliage again and again," etc., etc. A number of letters of this character were received from sections of the State where the soils are of a kind well adapted to the growth of these beets, and where the usual conditions of rainfall and temperature are favorable. Others of similar tenor came from localities where beets can doubtless be grown for table use or for cattle feed, but entirely unfit for sugar-making.

The first beets were received at the Station on the 30th of September; the last came on the 24th of November. In all, twenty-eight samples were received. Of these six were not tested, either because received in such condition or of such character as made them valueless for the purpose, or were not accompanied with the necessary information.

Upon the Station farm we planted one package (one pound) of the Vilmorin seed received from the State Bureau. Under instructions given the foreman to grow the beets quite thickly, so that they should not be coarse or overgrown upon the rather heavy dolomitic clay soil of the farm,—instructions which he very properly obeyed to the letter,—the beets when mature were small. After the removal of the collars, the average weight of the Station farm beets was only 7.8 ounces avoirdupois. The

weight per acre of the crop was seventeen and two-fifths tons. The beets were grown upon soil the previous year in corn, and in potatoes in 1892; no manure had been applied since the fall and winter of 1891.

The seed of the variety Vilmorin was sent out by the State Commissioner; the variety Mette by the Department of Agriculture at Washington.

The table is presented without further discussion. We are not informed how many parcels of seed were sent out, nor to how many different persons. We have presented below the analyses of twenty-two of a total of twenty-eight samples received by the Station Chemist.

ANALYSES OF SUGAR-BEETS GROWN IN 1894 FROM SEEDS SENT OUT BY THE STATE BUREAU OF AGRICULTURE:

Samples received at Agricultural Experiment Station, University of Tennessee, October 20 to November 24, 1894.

Analyses by J. B. McBryde, Chemist.

No.	Grown by	Place	Variety	Average Weight of Beets		Specific gravity of juice.	Sucrose, per cent.	Reducing Sugar, per cent.	Total Solids, per cent.	Solids not Sugar, per cent.	Purity, per cent.	Condition of beets when received; Shape compared with that of properly grown beets.
				Grams	Ounces							
1	J. H. Bradshaw	Y. Z., Grainger Co	Vilmorin	309.	10.9	1.056	8.80	.01	13.00	4.19	67.70	Condition, fair; shape, good.
2	Fred. S. Fisher	McMinnville, Warren Co	Vilmorin	433.6	15.3	1.042	6.99	trace	10.00	3.01	69.90	" good; " good.
3	Thomas & Bradford	Cumberland City, Stewart Co	Vilmorin	1125.5	39.7	1.050	7.77	.15	11.80	3.88	65.84	" fair; " fair.
4	Experiment Station	Knoxville, Knox Co	Vilmorin	220.8	7.8	1.076	16.20	.17	17.80	1.43	91.01	" good; " good.
5	John W. Morton	Nashville, Davidson Co	Vilmorin	250.6	8.7	1.071	12.22	.60	17.10	4.28	71.46	" good; " good.
6	G. C. Huffman	Normandy, Bedford Co	Vilmorin	662.5	23.4	1.049	8.23	.40	11.60	2.97	70.95	" fair; " fair.
7	J. B. Cartwright	Goodlettsville, Davidson Co	Vilmorin	302.5	10.7	1.075	15.71	.46	17.80	1.63	88.25	" good; " good.
8	Thos. S. Meyers	Isleford, Warren Co	Mette	785.	27.7	1.044	6.33	.35	10.00	3.32	63.30	" poor; " poor.
9	William Wallace	Gallatin, Sumner Co	Vilmorin	335.8	11.8	1.053	9.23	.16	12.50	3.11	73.84	" fair; " good.
10	W. A. Larkin	Huntland, Franklin Co	Mette	1026.6	36.2	1.064	11.11	.18	15.00	3.71	74.06	" poor; " poor.
11	J. A. White	Double Springs, Putnam Co	Mette	469.	16.5	1.047	9.58	.20	11.50	1.72	83.30	" fair; " fair.
12	J. W. Swadley	Sac, Sullivan Co	Mette	816.6	28.8	1.055	10.10	.06	13.00	2.84	77.70	" good; " poor.
13	H. D. Hanks	Sac, Sullivan Co	Mette	1001.6	35.3	1.051	9.54	.20	12.00	2.26	79.50	" fair; " poor.
14	J. N. Bryant	Nashville, Davidson Co	Vilmorin	370.	13.	1.058	10.95	.17	13.50	2.38	81.11	" fair; " good.
15	James Wilson	Sugar Tree, Decatur Co	Vilmorin	853.	30.1	1.048	6.56	.67	11.20	3.97	58.58	" fair; " poor.
16	M. T. Peebles	Marbleton, Unicoi Co	Mette	476.6	16.8	1.063	12.18	.06	15.00	2.76	81.20	" fair; " good.
17	D. A. Bond	Vineland, Washington Co	Vilmorin	593.3	20.9	1.057	10.47	.32	13.50	2.71	77.56	" good; " good.
18	S. L. Howell	Vineland, Washington Co	Vilmorin	760.	26.8	1.041	7.31	.36	10.00	2.33	73.10	" good; " good.
19	C. M. Niles	McGhee, Monroe Co	Vilmorin	641.	22.6	1.054	8.74	.37	12.75	3.64	68.55	" fair; " fair.
20	S. D. G. Niles	McGhee, Monroe Co	Vilmorin	981.6	27.6	1.047	9.52	.11	11.50	1.87	82.80	" fair; " poor.
21	S. L. Greer	Disco, Blount Co	Mette	595.	21.	1.062	11.43	.28	14.95	3.24	76.45	" fair; " good.
22	J. N. Lewis	Lone Mountain, Claiborne Co	Mette	773.3	27.3	1.062	11.08	trace	14.75	3.67	75.12	" fair; " fair.

Numbers 10, 12, 13, 15 and 20, roots short and thick. No. 13 had branched roots. Nos. 11, 13, 15, 16 and 20 grown high out of the ground.

Weight of beets as given is net weight after removal of "collars."

Average weight of beets is given in grams, and also in ounces avoirdupois. An ounce equals 28.35 grams.

Specific gravity of the beet juice is its weight compared with the weight of an equal volume of water, water being unity.

Sucrose,—cane sugar; found in sugar cane, maple, white beet, etc.; the ordinary white sugar of commerce.

Reducing sugar,—sugars other than cane sugar—raffinose.

Total solids per cent. are determined from the specific gravity.

Solids not sugar are the difference between *total solids* and the cane sugar+reducing sugar.

Purity, or purity co-efficient, the proportion of cane sugar to total solids; obtained by dividing the per cent. of sugar by the per cent. of total solids.

For the estimation of sugars the electrolytic method proposed by Professor B. B. Ross in the Journal of Analytical and Applied Chemistry, Vol. VI., No. 2, was used.

As already stated, the seasons of cultivation and growth this year were unfavorable, especially so for root crops. Under best management and in the hands of those already experienced in growing sugar beets, both quality and yield would have been below the average required for a profitable crop.

Of the samples received at the Station only two represented a crop which had been treated throughout as directed in the Circular Letter of Instructions. We know how difficult it is to follow specifically any plan of operations, however simple. One is apt to overlook this or that "little matter," as being of no great consequence; but whether we call it neglect, or carelessness, or necessity, the result is the same—total or partial failure. The instructions sent with the seed, and later when the beets were to be harvested, were made as plain and as simple as possible. These instructions were based upon the experience of many years and of many thousands of growers. The experiments were not to make trial of methods of cultivation, but to determine the one question alone—whether or not beets of the right quality can be produced on our soils and under conditions existing in this State. Meager and inadequate as were the results of this first attempt, we are by no means disposed to give up the inquiry. The experiments ought to be repeated, and by those whose work for the year of 1894 has taught that definite conclusions can not be drawn from uncertain data, and that tests of any kind must be made carefully, accurately and by scrupulous compliance with the instructions prescribed.

In Tennessee we can undertake these experiments under most favorable conditions, because we can do so without risk of loss of time, labor or money. The question of cattle-feeding is inti-

mately concerned. The manufacture of sugar in the near future is not the only inducement. We need for the most profitable production of meat and milk just such an addition to our feed-stuffs as can be obtained from beets, and for this purpose alone beet culture will more than repay our efforts. The first thing to be done is to prove that beets sufficiently rich in sugar can be grown, at such cost per ton as will justify the planting of large acreages within reach of the proper site for a sugar factory. This once determined all the rest will follow.

About the same time the beet seed were distributed, the State Commissioner of Agriculture published in the newspapers, and sent copies by mail to potato growers, the following circular letter:

To Potato Growers.

One of the leading agricultural industries of the State is potato culture. To produce potatoes in large quantity per acre, and therefore at low cost per bushel, is not a very difficult problem; but to maintain the high quality of the product, so as to realize the best price per bushel, is a very different matter.

Quality should be regarded as much as the yield; if we would get prices fairly remunerative, quality must be made of first importance. Potatoes deficient in starch, though fair in outward appearance, are much too frequently offered for sale by growers in Tennessee as well as elsewhere. The proportion of inferior product is annually increasing, and will eventually bring disaster to the potato industry if some active measures are not employed to prevent deterioration.

If potatoes containing a fair proportion, say fifteen per cent., of starch are worth for food fifty cents per bushel, such as contain only ten per cent. are not worth thirty-three cents per bushel, however carefully managed by the most competent cook. If the starch content be less than ten per cent., the potatoes are of little value for any purpose, and can not be profitably fed, even to hogs and cattle.

Improved quality is the result of long-continued effort, and has come slowly. Deterioration, on the other hand, is as rapid as it is easy, and is always sure to follow careless methods, whether in the choice of seed, the selection of proper soil, mistakes in fertilization, etc.

The Commissioner asks the co-operation of farmers, particularly in those sections of the State where potatoes are largely grown for market, in an effort to improve both the yield and the quality of this valuable crop. With very little trouble, and an expense of only a few cents to each farmer who may desire to help in this work, such facts will be ascertained as will make it possible to greatly increase the real and market value of the potato crop of Tennessee.

The Commissioner has arranged that the Experiment Station of the University of Tennessee will make analyses of the potatoes used for seed, and of the crop produced from such seed, by those who are growing potatoes for market, under the following conditions:

Samples, not less than two nor more than three pounds in weight, representing the average seed to be used for planting, are to be sent to the Experiment Station at Knoxville, by express prepaid. The sample tubers must be wrapped, each one separately, with two or three thicknesses of paper, and snugly packed in a wooden box, (a cigar box will answer the purpose), so as not to be bruised during transportation. These samples should be forwarded at the time of planting the crop. Each package must be accompanied by a statement of the name of the variety, the date of planting, the number of acres planted, the character of the soil, the crops grown on the land in 1893, 1892 and 1891, with such particulars as to the crops of those years as can be positively and clearly stated.

A sample, of about the same weight, of potatoes grown from the seed of which samples were sent at the time of planting, must be sent in the same manner, when the crop is dug for marketing, so as to represent fairly the average crop. This package must be accompanied by a statement of the date of planting; manner of cultivation; fertilizer used, how much per acre and how and when applied; the date of harvest of crop; and the yield per acre. It is also desired that it be stated whether or not the vines were dead when the potatoes were dug, with such facts as will indicate the degree of maturity of the crop when harvested.

These samples, of the seed used and of the resulting product, will be analyzed by the chemists of the Station, and the results communicated to the parties immediately interested. The entire series of analyses, with full statements of all the information received as to soils, cultivation, fertilization and yield, and a discussion of the results, with such suggestions as may appear necessary, will be published for general information.

Not only the name of the variety planted, but its immediate origin, whether grown at home or purchased, and, if possible, the section of country in which the purchased seed was grown, should be stated.

The facts thus obtained will give information upon which can be based the further investigation of the soils, the proper use of fertilizers, the methods and character of cultivation, etc.

In response to this invitation there was received at this Station, from John C. Bridgwater, Mount Juliet, Tenn., samples of six varieties, and from Hugh L. Craighead, Nashville, one sample of seed potatoes.

Of these samples the following determinations were made by Professor J. B. McBryde:

No	Received from	Variety	100 Parts contain			Specific Gravity.
			Water	Dry Matter	Starch	
1	John C. Bridgewater, Mt. Juliet, Tenn.	Hoosier, (late potatoe).	84.34	15.66	14.45	1.068
2	John C. Bridgewater, " " "	Beauty of Hebron. (Second crop)	80.90	19.10	14.14	1.077
3	John C. Bridgewater, " " "	Freeman, (Second crop).	80.16	19.84	12.57	1.079
4	John C. Bridgewater, " " "	Early Triumph. (Second crop).	83.34	16.66	13.89	1.065
5	John C. Bridgewater, " " "	Early Puritan, (Second crop).	74.48	21.52	16.05	1.081
6	John C. Bridgewater, " " "	Early Rose, (Second crop)	84.60	15.40	11.10	1.080
7	Experiment Station Farm.	N Y. Early Rose.	76.39	23.61	16.71	1.072
8	Hugh L. Craighead, Nashville, Tenn.	Early Triumph.	83.68	16.32	13.21	1.074

We have received one sample of potatoes grown from seed named in the above statement, besides those grown on the Station farm. The results are as follows:

No.	By Whom Grown	100 Parts contain			Specific Gravity.
		Water	Dry Matter	Starch	
9	Experiment Station Farm, Plat No. 1.	80.88	19.12	15.01	1.073
10	" " " " 2.	79.22	20.78	13.12	1.071
11	" " " " 3.	82.29	17.71	11.71	1.071
12	" " " " 4.	81.95	18.05	11.17	1.070
13	" " " " 5.	80.72	19.28	12.01	1.080
14	" " " " 6.	81.19	18.81	11.99	1.076
15	" " " " 7.	83.62	16.38	12.15	1.070
16	" " " " 8.	77.78	22.22	12.17	1.079
17	Hugh L. Craighead, Nashville, Tenn.	82.05	17.95	13.90	1.074

The Secretary of the Department of Agriculture, the Hon. J. Sterling Morton, determined to put into operation what he, as we think wisely, claimed to be the proper way to distribute seeds of new and valuable plants and varieties of plants, so that the expenditure of money, time and labor in this sort of work might bring best results. To one hundred and twenty-two different persons, whose names and addresses were furnished from the list of best known correspondents of this Station, were sent seeds, of such kinds and in such quantity as suggested by the Secretary of the Station. About the 20th of December, blanks for "reports on co-operative tests of seeds" were mailed to each one of these one hundred and twenty-two persons. As this statement is being prepared for the printer, every mail is bringing us the "reports," al-

most every one of which is accompanied by a letter of hearty approval of the plan, requests for seeds to be sent for trial, and assurances of resolve to give the work in future more careful and accurate attention.

We hope that at an early day, and in time to make up our application to the Secretary of the Department of Agriculture for such seeds as may promise to be of value to our people, the Reports asked for will be received at the Station. If this plan is to be successful, it must be carried out in good faith and entirety. Those to whom seeds have been sent and fail to make the reports asked for must not complain if no more are sent to them. To those who have shown their faith by their works this Station is desirous and is ready to give all the assistance permitted by our resources.

If further trial is to be made in the growing of sugar beets, the Commissioner of the State Bureau will probably distribute the seeds to parties whose lands are of such character as will make success most probable, and to those who will undertake the experiment carefully, and who will follow as exactly as possible the methods directed. Except under such conditions, further effort is useless.

The Station will continue the proposed work on potatoes, if there is any evidence that growers desire it. The results of experiment everywhere have convinced us that it is not only possible, but quite easy, to maintain the high content of starch by proper methods of fertilization and cultivation; that the application of fertilizer either at the time of planting or during cultivation are of uncertain value, and that the preparation of the soil intended to produce potatoes of high quality must begin a year or more before the crop is to be grown. It is for this reason that we ask the history, for the preceding two or three years at least, of the land upon which the crop is to be grown. It is usually true that the best table potatoes can be grown upon newly-cleared land,—so-called virgin soil. A statement, therefore, as to the number of years since the land was cleared will be of great value to enable us to understand the exact conditions under which the farmer is working, and to recommend methods to bring up the soil so that it may produce potatoes rich in starch and therefore best fitted for human food.

We publish this as a Bulletin of Progress. It is a plain statement of facts, the reading of which by the farmers of Tennessee may set them to thinking seriously whether or not they are using, as fully as they may and ought, the helpful aid of the Department of Agriculture, the State Bureau and the Experiment Station.