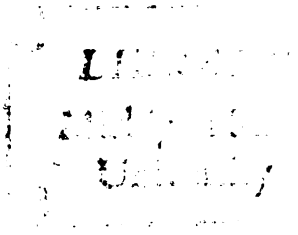

THE SELECTION OF SEED.

The selection of seed for growing plants is a question which has been prominent in Agricultural and Horticultural Societies for some years, and many experiments have been conducted along this line.

The experiment station at Geneva, New York, has, from time to time, published the results of their seed selections; and while they generally favored the selection of large seeds, there was an occasional preference for the small.

In 1885 an experiment with onion seed gave only a slight difference in favor of the large seed. Again, the same year, cabbage seeds were tried, when, to their surprise, the smaller seeds gave the larger, sounder heads; cauliflower also gave preference for the small seed; but in both the plants were from ten days to two weeks later in maturing.

In 1887 they tried an extensive experiment with large and small oat seed, and the results obtained were such as to warrant the New York Station in making the statement that "there was wisdom in planting selected seeds."

THESIS

This decision is not surprising, it corresponds with experiments made by others; among them Francis Galton's, the outcome of which he gave in a lecture before The Royal Institution of England, February 9th, 1877. His experiment was conducted by distributing the seeds to different farms in England, and having the results overturned to him for study. He stated that "the offspring did not tend to resemble the parent in size but to be smaller than the parent if the parent was large, and to be larger than the parent if the parent was small." His conclusion was based not only on this experiment, but also on a close study of the human family, and he laid down this law-

"The mean filial regression towards mediocrity was directly proportional to the parental deviation from it."

Prof. B. T. Galloway, of the National Department of Agriculture, in an article printed in "American Gardening," September 26,1896, makes some valuable statements in regard to the planting of selected seed of the radish. By using large, uniform seeds the radishes matured early and the entire crop was marketable at the same time. In this manner he was able to get 90% of the crop at once and coming early into market he commanded top prices. The uniformity of the product allowed him to clear his ground immediately and prepare for a new crop. He stated further- "Where seed, as ordinarily obtained in market, is used, about 35 per

cent of the crop will reach marketable size in from 35 to 40 days; 28 per cent will require 15 days longer; while the rest will probably never be worth anything. Prof. Galloway recommended that, in order to separate the inferior seed and dirt from the large seed, a sieve be constructed of "a circular piece of thin sheet brass 6 inches in diameter, with holes 2/25 of an inch in diameter cut in it, the holes about 1/16 of an inch apart. The perforated sheet then provided with a rim of brass or tin 2 inches high." This makes a cup in which the seed can be put and the small ones, with the dirt, shaken through the holes, leaving only the large seeds in the dish.

As subject matter for this thesis the following experiment in seed selection was conducted during the winter at the College.

Three grades or sizes of seed, large, average, and small, were selected from the following eight garden plants: radish, turnip, cabbage, lettuce, beet, tomato, onion, and carrot. One hundred of each sixe were taken, making three hundred seed from each of the above vegetables. These were divided into lots of 50 seeds each, that the experiment might be duplicated; thus more nearly obtaining an average result, and also establishing a check on the experiment.

The seed was planted in six boxes; tow being for large seed, two for small, and two for the seed of average size. This put 50 of each kind of seed in each box.

Table I.

Order and Arrangement of the Seed as Planted Jan. 12,1899.

	Let-tuce.	On-ion.	Beet.	Car-rot.	Cab-bage.	Tur-nip.	To-mato.	Rad-ish.
Box I- Large seed- - - -	50	50	50	50	50	50	50	50
Box II-Large seed- - - -	50	50	50	50	50	50	50	50
Box III-Average seed - -	50	50	50	50	50	50	50	50
Box IV-Average seed- - -	50	50	50	50	50	50	50	50
Box V-Small seed- - - - -	50	50	50	50	50	50	50	50
Box VI-Small seed- - - -	50	50	50	50	50	50	50	50

After a thorough mositening the boxes were placed in a forcing house with a temperature of about 50° F. The facts which were to be noted will be found in Table II. 1st. Date of appearance above ground; 2nd. Number of days between planting and appearance above ground; 3rd. Per cent of seeds germinated. Whenever it may appear, (a) stands for the average,(l) large, and (s)small, each of these referring to the size of seed used.

Table II.

marks those where the per cent germinating from the large seed fell below those of the seed of average size.

Name.		Date of appearance above ground.	Number of days to appear above ground.	Per cent of seed germinating.
Radishes-	(a)	Jan. 14	2	90
"	(l)	" 14	2	94
"	(s)	" 15	3	85
Turnips-	(a)	" 24	12	40
"	(l)	" 23	11	50
"	(s)	" 27	15	34
Cabbage-	(a)	" 28	16	26
"	(l)	" 27	15	37
"	(s)	" 31	19	15
Lettuce-	(a)	" 16	4	93
"	(l)	" 16	4	96
	(s)	" 16	4	83
Beet-	(a)	" 17	5	#160
"	(l)	" 17	5	#150
"	(s)	" 17	5	128
Tomato-	(a)	" 19	7	40
"	(l)	" 19	7	50
"	(s)	" 20	8	34
Onion-	(a)	" 20	8	60
"	(l)	" 20	8	60
"	(s)	" 20	8	50
Carrot-	(a)	" 31	19	#50
"	(l)	" 31	19	#45
"	(s)	" 31	19	30

The radishes appeared above ground in two days, the three different sizes sprouting at about the same time; the lettuce germinated in four days; beets, five days; cabbage, sixteen days;carrots, nineteen days. The small seed sprouted last in every case, but was only noticeable to any extent in the cabbage and turnip, where in both cases the small seed was three days later than the large.

After the appearance of the plants above ground the growth was noted carefully from day to day. February 6th, twenty-five days after planting, a careful estimate was made and it was found that the plants from the large seed were better developed, being uniform in size and easily outclassing those in the other boxes. Of the plants from the seed of average size, there was a lack of regularity in growth, and, as a rule, the number was less than from the large seed. The small seed produced the least number, and to all appearances they were infirm in growth and vitality.

Table III.

Weights of 10 radishes from the different size seed.

10 radishes from small seed weighed 9 oz.
10 " " average size " " 14 oz.
10 " " large " " 19 oz.

These results were obtained 26 days after planting, when the above table shows that the plant growth was much in favor of large seed.

From Table II, showing the per cent of seed germinated,we find that, with two exceptions, the per cent of plants from the large seed is the greatest. With the beets

and carrots the seed of average size put forth the greatest number; but this might be explained by the fact that it was very difficult to separate the seed. The per cent germinating from the large and average onion seed was equal. But taking the germinating test as a whole, the per cent was always least with the smaller seed, and there was a decided preference for large seed.

March 1st, forty-seven days after planting, the tomato and cabbage plants were taken from the seed boxes, where they were confined for space, and transplanted. Ten plants were taken from the seeds of different size, making thirty tomatoes and thirty cabbages. March 7th, of those which had been re-set the stems sent out from the large seed were in the lead, being at least 1/6 larger than those from the average seed; inferior stems were found only among those sent out by the smaller. Two weeks later the large and average plants were nearly equal, while the small ones were much the latest. The tomatoes did not differ in size as much as did the cabbage, but this was probably due to the fact that the larger tomato plants had started flower buds.

March 28th, the cabbage and tomatoes were weighed, and the results of the weighing are given in Table IV.

Table IV.

Average Weight of the Tomato and Cabbage plants in grams.

4	cabbage	from large seed- - - - -	1.93	grams.
5	"	" average " - - - - -	1.90	"
5	"	small " - - - - -	1.85	"
5	tomatoes	" large " - - - - -	8.50	"
5	"	" average " - - - - -	7.00	"
5	"	" small " - - - - -	6.00	

The average was taken of 5 plants in each case, with the exception of the cabbage from the large seed, where only 4 were available.

This table above gives a preference to selection of large seed in the cabbage and tomato.

Nine tomato plants were left growing, three from each sized seed, and April 6th buds had started on all of them. April 12th two plants from the large seed and one from the average had opened flower buds, but those from the small seed had not.

The experiment closed April 2;th; the nine tomatoes remaining were cut, carefully weighed, and the buds and flowers counted.

Table V.

Number of Buds Produced, and Average Weight of Plants in Grams.

			No. of Buds.	Av. Wt. in Grams.
3	tomatoes	from large seed- - -	43 - - - - -	3 1/3
3	"	" average " - - -	41 - - - - -	3
3	"	" small " - - -	18 - - - - -	3

The plants from the large seed were superior in growth and had the greater number of buds and flowers; the plants from the average sized seed had nearly the same number of buds, but were perhaps a week later; those from the small seed were equal to those from the average sized seed in growth, but were much later in development of buds, having only eighteen.

The results which have been attained warrant us in saying that "plants from selected large seed are earlier in maturity; they have a greater plant growth and produce the greater number of fruit buds."

Men prominent in agricultural interests recommend a careful study of the various experiments along this line. And when we consider the importance of seed in the growing of a uniform crop to early maturity, and the large amount of money expended annually by farmers and gardaners in our State alone, for the growing of farm and garden products, we can readily understand what is to be gained by the selection of perfect seed, and the loss occasioned by the planting of worthless and impure seed.

With the results of the various seed experiments in mind it is well for a person to be guided in his selection of seed by a few general rules.

1st.- Select a desirable variety of seed and satisfy yourself that it is true to name.

2nd.- Test the germinating power and insist on the seed being standard.

3rd.- Select the large seed by means of a seed separator. In some cases the small and inferior seed cannot be separated, but the farmer must use his judgment.

If the grower will follow these three steps, they will insure him a profit which will command a good market; his crop will be uniform on the ground from having tested the germinating power, and he can harvest the entire field at once, which will be less expensive and at the same time the ground is made ready for the next crop.

Peas Affected by the Pea Weevil.

In connection with the experiment in seed selection there were some pea seeds containing the pea weevil. The seed was planted to show the evil effects of the work of the weevil on germination.

Fifty seed which had been entered by the weevil were selected, also fifty which had not. These were planted in rows, and all had the same care.

Of the fifty which appeared sound, 43 germinated in five days, the other 7 did not develop beyond a slight swelling, due, no doubt, to the moisture in the soil.

Of the fifty containing the weevil, none developed or showed any sign of germinating, and they swelled but slightly.

The peas which were affected were badly so, and there is no wonder that they failed, but it is our opinion that, if the weevil has not eaten in to the canlide, the pea, although defective and liable to decay, may retain vitality sufficient to germinate.