





LIBRARY  
OF THE  
UNIVERSITY  
OF ILLINOIS

630.7  
1166  
no. 61-84

AGRICULTURE



NON CIRCULATING

CHECK FOR UNBOUND  
CIRCULATING COPY.



# UNIVERSITY OF ILLINOIS

## Agricultural Experiment Station.

---

URBANA, NOVEMBER, 1902.

---

BULLETIN NO. 81.

---

FORCING TOMATOES.

---

BY ALVIN C. BEAL, B. S., ASSISTANT IN FLORICULTURE.

The rapidly growing cities of Illinois offer an increasing market for forced vegetables. The demand for forced tomatoes in most of our large cities, begins as soon as the frost has destroyed the out-door crop and lasts until February when the Florida crop usually appears in the market. To supply the market during this period the grower must have a light, tightly constructed house in which a high temperature can be maintained in the coldest weather. Considerable skill is necessary for the successful management of the crop owing to the peculiar difficulties in growing tomatoes at this season of the year. The tomato is a sun loving plant and during the short days with periods of cloudiness it is sometimes a problem to obtain a good setting of fruit.

From the above reasons it will be seen why tomatoes must bring from twenty to fifty cents a pound in order to pay a profit to the grower. If tomatoes can be profitably grown at the lower figure given they can be sold in any city that supports a florist business. Few people can resist the temptation to purchase fruit or vegetables that are in the market out of season. If these prove to

be as palatable as the naturally ripened product the demand increases even at what at first would seem to be an exorbitant price.

Fortunately the demand for forced tomatoes does not cease upon the appearance of the Southern product in the market. The forced tomato is far superior to the shipped tomato both in appearance and quality, it being necessary for the latter to be picked green and ripened in transit. Therefore the home product sells for a higher price. As the weather becomes warmer the price decreases and the demand increases. The grower is able to meet the decreasing price because less and less artificial heat is needed to ripen the crop. Many times otherwise idle houses can be used for the spring crop.

The expense of caring for tomato plants, while small, is light, as they are then in pots and require little room. After transplanting into the benches the aim should be to get fruit as soon as possible as the plants are occupying valuable space. If the plants have not been properly checked before transplanting into rich soil they make a splendid growth, sometimes producing little fruit, but usually the crop is simply delayed. Many growers secure no return for ninety or a hundred days after benching their plants, when half that time is all that is necessary. The expense of heating the house for the extra time is quite an item for the grower's consideration.

Tomatoes may be planted among carnations in the spring and when the Easter rush is over given the entire space with a thorough dressing of fertilizer. Tomatoes for the spring crop are grown after lettuce, radishes and similar crops. As little heat is required, such houses, if of sufficient height to train plants, are well suited to the purpose.

#### THE HOUSE.

In order to study the growing of tomatoes under glass one of the new greenhouses erected by the College of Agriculture was devoted to the purpose.

The house is of even span, twenty by thirty-five feet in size, and stands with the length east and west. There are continuous lines of sash ventilators along the south side and on each side of the ridge, containing 16 by 36 inch glass. The sash in the north side are the same size but are stationary, and form a part of the partition wall. The glass in the roof is 16 by 26 inches, lapped upon ordinary sash bars. Owing to the height of the inside walls the ridge is thirteen feet above the walk, allowing much head room. On the center bench a uniform height of eight feet is to be

had, while on the side benches four and a half feet is all that can be had for the back row of plants.

There is a door in the center of the west end which opens into the Palm House, a structure much taller than the tomato house from which it cuts off considerable afternoon sunlight, particularly from the west end of the north bench. A comparison of the yields of the plants on the center bench shows a decrease from the east to the west end, due to this cause. The plants were in every respect equal in size. The east end of the house opens into a house of similar size and construction used for growing cool vegetables. The house was exposed therefore on the south side only.

The house is heated with steam which is carried the length of the house overhead in a three inch pipe and returned under the side benches only in twenty one-and-one-quarter inch pipes. These were arranged the first year in coils of five pipes each. This arrangement did not admit of absolute control, but a uniform pressure of five pounds was maintained. The steam is furnished by the Central Heating Station of the University and for this reason no data on the amount of fuel or cost of heating can be furnished.

#### METHOD OF HANDLING.

Seed of Combination and Yellow Prince varieties were sown in flats of moderately rich soil October 23, 1900. A fibrous potting soil made of rotted sod and a little sand gives excellent results. As soon as the plants were large enough to handle they were potted in two and a half inch pots. About December 1st they were shifted into three and a half inch pots where they remained until January 9th, 1901, when they were benched. At the time of planting they were all showing open blossoms and were very much pot-bound. The open blossoms set fruit and the plants continued to blossom at every third or fourth joint. Unchecked plants come into bearing later as it takes time to fill the soil with roots and thereby check the excessive growth. On such plants the first fruit appears high up on the plant when it should be near the ground with a continuous succession of clusters up the stem.

#### SOIL.

The soil for the benches was made of one-half rich garden loam and one-half rotted compost which had been derived from the rotting of manure, straw, corn stalks, etc., until they had entirely lost their fibrous character.

The compost made the mixture light in texture and very rich in composition. Water passed through it readily and it remained



FIG. 1. TOMATO PLANT READY FOR TRANSPLANTING TO THE BENCH.



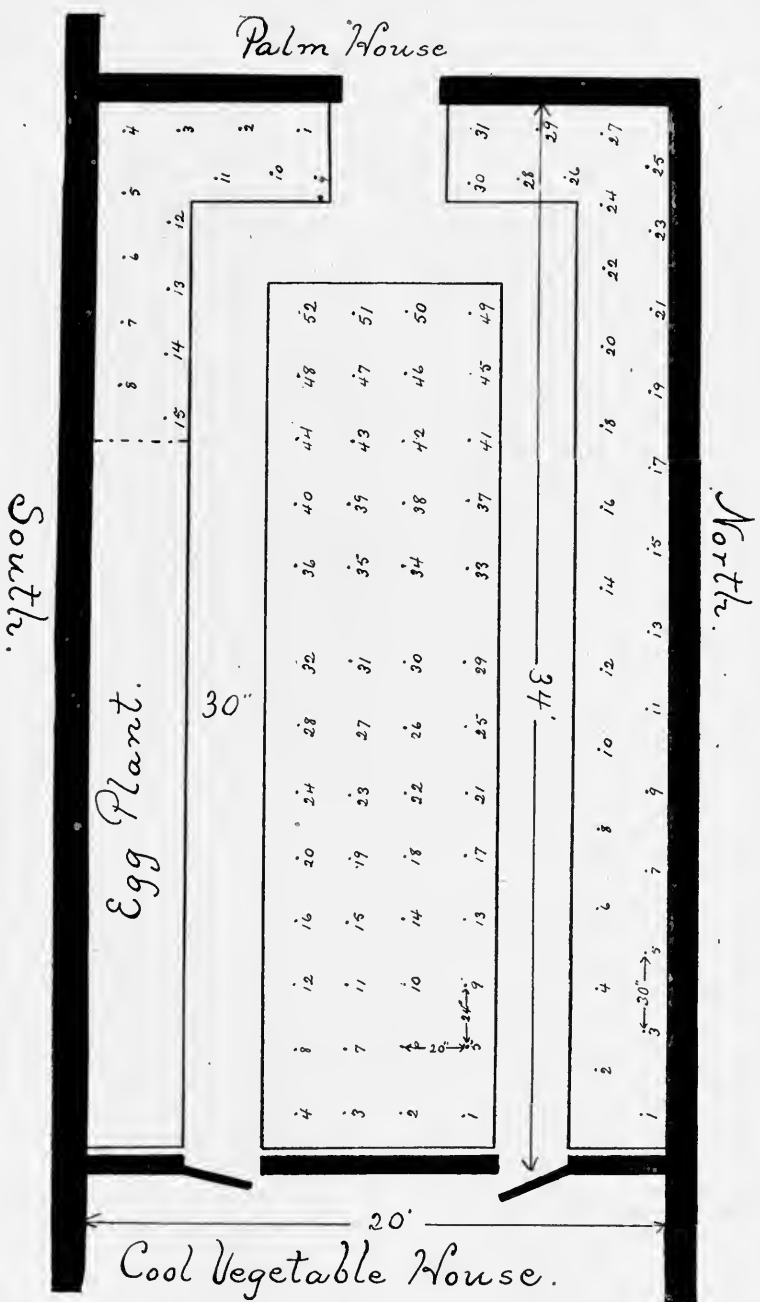


PLATE I. DIAG RAM OF TOMATO HOUSE, 1901.

loose and open throughout the experiment. Tomatoes do best in a very rich mellow soil and if properly managed will fruit abundantly under glass. There is a prevalent idea that tomatoes under glass require a comparatively poor soil. This is probably due to the fact that the plants are usually not checked before planting, and therefore in a poor soil they sooner exhaust the readily available plant food. Where such a compost as the one described cannot be obtained, a mixture of rich garden loam with one-fourth well rotted manure will furnish suitable soil for this crop.

#### FERTILIZERS.

Two applications of wood ashes were made after the plants were in full bearing. The ashes were applied at the rate of twenty pounds per hundred square feet of bench. Aside from this, no fertilizers were given as the soil appeared to afford all the plant food necessary.

#### PLANTING.

The benches are six inches deep and were filled with the soil. The north side bench is forty inches wide and thirty-six feet long, extending from the east end of the house around to the west door. Two rows, eighteen inches apart were placed on this bench, the plants being two feet apart in the row. This placed the back row one foot from the rear of the bench and the plants were alternated with those in the front row so that the former had as favorable light as possible. Thirty-one plants of the Combination were planted on this bench.

The center bench contained fifty-two plants of the Combination, planted in four rows twenty inches apart, running lengthwise, the plants being twenty-four inches apart in the row.

A portion ( sixty square feet ) of the south bench was planted to Yellow Prince. The west end of the bench was used and the plants were the same distance apart as those on the north bench. They received more light than the plants on the north bench, a point to be kept in mind in comparing yields.

Only fifteen plants were used, as yellow tomatoes are not in much demand at any season of the year. The variety represents the stocky, large-leaved type of tomatoes, however, and the results indicate something of the adaptability of this type to house conditions.

#### TEMPERATURE.

The temperature was kept as near 70 degrees at night as possible. On cloudy days it was kept at from 75 degrees to 80 degrees, and on sunny days as high as 90 degrees was reached. Fresh air was given when the temperature went above 80 degrees but care was exercised to avoid draughts of cold air.

## WATERING.

During dark weather great care must be given to the watering. If this operation is carelessly done the under soil remains dry, while if the soil is drenched the plants may be troubled with dropsy or oedema, a physiological disease. A dry atmosphere is the best for tomatoes and the plants should never be syringed unless troubled with red spider, for a damp atmosphere promotes rot and interferes with pollination.

## TRAINING.

Each plant was trained to a single stem. As a support for the plants, binder twine was used. A single strand was run from the base of each plant to a point on the sash bar as near overhead as possible, where it was tied to a nail, while the lower end, to prevent accidents, was tied into a loop of wire which passed through the soil and the crack in the bottom of the bench, where it was made fast. This furnished a neat and secure support. The plants were tied to it with raffia at intervals of about a foot. Sometimes the plants are simply twined about the strings, but in this method the plants often slip down under their load of fruit. When down, the plants are more likely to be broken when picking the fruit, and certainly they do not look so well as when they are properly tied up. The system of training used affords the plant all the light and air possible. The fruits set evenly and the crop is easily gathered. To admit more light the larger leaves were clipped back one-half their length. All side shoots were pinched out as they appeared.

When the plants on the north side bench reached a height of five feet and those on the center bench eight feet the leaders were pinched. The Yellow Prince did not grow five feet in height.

Soon after the fruits of a cluster had set the cluster was supported by slings of raffia carried over the axil of a leaf above it. If this is not done the cluster drops down from its own weight preventing the full development of the fruit.

Again it will be found in vigorously growing plants that the fruit clusters have a tendency to "break" or push out a shoot from the end. All such shoots should be quickly removed if good fruit is desired, as the fruits of clusters on which these shoots are allowed to grow are more likely to be irregular and are smaller than those upon clusters from which the shoots are clipped.

## POLLINATION.

Tomatoes require a warm, dry atmosphere:—first, to avoid rot, which is worse in a damp, close atmosphere; second, to facilitate pollination. On bright, sunny days the pollen is shed freely during the middle of the day if the above conditions are observed. In



FIG. 2. TOMATO PLANT SHOWING THE AMOUNT OF LEAF PRUNING.



FIG. 3. VIEW OF THE TOMATO HOUSE FIFTY DAYS FROM PLANTING.

the short days of midwinter when the wind or other agencies cannot act in the houses it is necessary to pollinate by hand in order to secure success. The plants under consideration were pollinated every other day when the pollen could be secured. In cloudy periods the flowers open and remain open longer than if pollinated, but after a time they drop off if pollination has not occurred. One whole setting of tomatoes was lost just before Easter, 1901, because no pollen would ripen. In pollinating the tomatoes a teaspoon was used to collect the pollen obtained by tapping the flowers with a lead pencil or similar instrument. It is a simple operation to touch the stigmas in passing from flower to flower. After a little practice one becomes expert and also can determine at a glance those flowers which will yield pollen and which are ready for pollination.

Experiments by Professor Munson\* show that insufficient pollen produces small, or one sided fruit. Where he applied an excess of pollen he secured large, symmetrical fruits. Here we find an explanation for most of the small and perhaps all of the one-sided fruits seen among greenhouse tomatoes. We therefore believe that hand pollination will give a greater per cent. of normally developed fruits than any other method.

When the weather has become warm enough for the bees to fly about and it becomes necessary to give full ventilation it is not necessary to continue hand pollination for the natural agencies perform the operation.

#### INSECTS.

The only insect that has given us any trouble has been the "white fly" (*Aleyrodes Vaporariorum*) which appeared in May. The general recommendation has been to fumigate with tobacco smoke, but we found that the insect gained a foothold in spite of a thorough weekly fumigation as strong as the plants would bear. Also it was found that if the house was fumigated oftener the blossoms were injured to such an extent as to reduce the yield. The insects certainly die hard under such fumigation, as it does not affect the adults further than to bring them down until the smoke clears away.

Red spider was found on one plant, but by picking off two or three leaves and syringing this particular plant no further trouble was caused by this pest, and it never appeared on the tomatoes afterwards, although peppers in the same house had to be constantly watched. With a clean house and clean stock no trouble ought to occur from this pest in the growing of tomatoes.

---

\*Annual Report of the Maine Experiment Station for 1892, Part II.

## DISEASES.

The plants, with one possible exception, were entirely free from disease. Plant number one of the center bench did not do well for a time from some cause thought to be physiological, but later it recovered and bore some good fruit.

## YIELDS.

The number of ripe fruits from each plant and the total weight of the pickings from each bench for each day were recorded. The first ripe fruit was gathered from the Yellow Prince February 25th, and from the Combination on the center bench February 28th. The north bench gave no fruit until March 2d. Thus fruit was secured in seven weeks from benching or in 128 days from seed.

YIELDS ON NORTH BENCH.—NUMBER OF FRUITS.

No.	Feb.	March	April	May	June	Total
1		1	10	4		15
2		3	13	5		21
3		4	11	1		16
4		5	14	5		24
5		4	9	4		17
6		6	11	5		22
7		6	6	3		15
8		2	10	3		15
9		6	5	0		11
10		5	7	6		18
11		8	6	7		21
12		3	8	4		15
13		6	9	5		20
14		6	12	2		20
15		8	8	0		16
16		6	12	3		21
17		9	4	4		17
18		5	6	3		14
19		6	7	4		17
20		5	5	4		14
21		3	4	4		11
22		6	7	2		15
23		3	6	0		9
24		5	10	2		17
25		11	7	2		20
26		1	4	0		5
27		5	5	0		10
28		6	4	10		20
29		4	7	5		16
30		5	4	8		17
31		4	7	11		22
Total No.		158	238	116		511
Total Weight	37 lb. 8 oz.		65 lb. 10 oz.	27 lb.		130 lb. 2 oz.

130 lb. 2 oz. = 2082 oz.

2082 oz. ÷ 31 =  $67\frac{5}{31}$  oz. = 4 lb. 3 oz. average per plant.

2082 oz. ÷ 120 =  $17\frac{1}{3}$  oz. per square foot of bench.

511 fruits ÷ 31 =  $16\frac{11}{31}$  average number of fruits per plant.

2082 oz. ÷ 511 =  $4\frac{33}{511}$  oz. average weight of each fruit.

## YIELDS ON CENTER BENCH.—NUMBER OF FRUITS.

Plant No.	Feb.	March	April	May	June	Total
1		3	4	2	4	13
2		3	9	9	5	26
3		3	11	14	16	44
4		6	9	4	17	36
5		6	11	7	5	29
6		4	10	8	9	31
7	1	3	11	8	6	29
8	1	6	10	9	14	40
9	1	4	15	7	4	31
10	1	3	14	14	6	38
11	1	3	10	10	5	29
12		6	6	13	8	33
13	1	6	9	8	5	29
14		7	14	12	5	38
15		4	8	14	7	33
16		7	8	11	8	34
17		7	9	6	9	31
18		5	9	11	8	33
19		5	12	11	11	39
20		2	11	12	9	34
21	2	2	14	10	9	37
22	1	2	11	6	14	34
23		9	12	5	16	42
24	1	5	10	13	8	37
25	1	3	8	6	5	23
26		6	11	8	5	30
27		5	8	9	4	26
28		5	14	11	2	32
29		6	11	10	11	38
30		5	11	1	7	24
31		7	12	6	5	30
32	1	5	12	9	9	36
33	1	5	13	10	7	36
34		6	7	6	8	27
35	1	5	10	22	8	46
36	1	5	9	7	6	28
37		5	9	11	3	28
38		6	5	7	10	28
39		7	6	16	4	33
40		7	7	10	9	33
41		6	11	8	1	26
42		3	8	9	5	25
43		6	11	12	6	35
44		8	8	7	4	27
45		7	11	3	3	24
46		5	10	8	5	28
47		6	4	6	5	21
48		3	13	16	6	38
49		8	9	6	4	27
50		5	9	6	1	21
51		5	8	8	8	29
52		5	5	7	2	19

Total No. 15 266 507 469 361 1618  
 Total Wt. 3 lb. ½ oz. 58 lb. 2 oz. 128 lbs. 119 lb. 13¼ oz. 106 lb. ¼ oz. 415 lbs.

415 lb. + 5 lb. of which no plant record was kept gives a yield of 420 lbs.

420 lb. ÷ 52 = 8 lb. average per plant.

420 lb. ÷ 174 = 2½ lb. per square foot.

415 lb. × 16 ÷ 1618 = 4.8 oz. average weight per fruit.

1618 fruits ÷ 52 = 31 fruits per plant.



## YIELDS OF YELLOW PRINCE ON SOUTH BENCH.

No. Plant	Feb.	March	April	May	June	Total
1		5	4	6	1	16
2		4	2	1		7
3		6	2	1		9
4		6	1	5	11	23
5		4	4	2	6	16
6		6	4	5	1	16
7		1	8	7	6	22
8		2	8	4	1	15
9		5	7	1	1	14
10	I	3	3	0	9	16
11		5	7	3	4	19
12		2	8	4	6	20
13	I	1	2	3	3	10
14		9	8	0	5	22
15		3	6	6	1	16

Total No. 2                  62                  74                  48                  55                  241  
 Weight 6½ oz.    155½ oz.    214 oz.    178¾ oz.    130½ oz.    685¼ oz.

685¼ oz. ÷ 16 = 42 lb. 13¼ oz.

685 oz. ÷ 15 = 45⅔ oz. average yield per plant.

685 oz. ÷ 60 = 11⅝ oz. per square foot of bench.

685 oz. ÷ 241 = 2⅔ oz. average weight of each fruit.

241 fruits ÷ 15 = 16⅓ average number of fruits per plant.

It will be seen that the average size of the fruits and the yield were no greater upon the plants with bottom heat than upon those without it. However the difference in amount of light may have overcome any possible effect of bottom heat. The difference in average weight of the fruits for the month of March was about one quarter ounce while the average number of fruits per plant was the same. One is led to believe from this that there was no practical benefit from the bottom heat. The average weight of the fruits on Combination during March was three and one-half ounces but with the increasing sunshine of spring the average rose to over four ounces. The average weight of the fruits of Yellow Prince for the season was less than three ounces compared with an average of over four ounces for Combination.

The average yield per plant of Yellow Prince up to May 17th, was thirty ounces compared with sixty-seven ounces upon Combination plants of the north bench, and the yield to July 1st was forty-five ounces against one hundred and twenty-nine ounces on the plants of the center bench. The yield for this yellow variety was only about one-third as much as for the Combination for the whole season, although the plants had plenty of head room and were treated in every way similar to the Combination. In addition to the inferior average size and yield the fruits were more uneven in size, many weighing less than two ounces each. There was no

demand for them in the market here, and it is doubtful if they are worth growing at all unless it be a few plants for the sake of variety.

#### WINTER CROP, 1902.

It was determined last year to test the leading forcing kinds side by side in order to fully compare them as to their adaptation for the purpose of winter forcing. For this purpose seed was obtained from a leading seedsman.

The seed was sown August 20th in flats of rich fibrous soil. The little plants were transplanted as soon as large enough to handle, into two and a half inch pots, and October 7th shifted into three and a half inch pots.

The soil on the center bench was in good condition and as the house was new and the previous crop was entirely free from disease, it was partially removed and the bench filled with more rotted compost and the whole thoroughly mixed.

The plants, which were then showing bloom and young fruit, were planted out on the center bench November 7th at the same distance apart as those of the previous year. Two rows of each variety were planted, beginning at the east end, in the following order: Combination, Lorillard, Best of All, and Eclipse. Then one row of each variety in the same order, the thirteenth row being planted to Combination. This gave three rows of each variety except Combination, of which there were four, distributed so as to overcome any differences in light or other conditions.

The heating pipes were changed so that the temperature could be kept more uniform in very changeable weather. So far as methods of training, watering, pollination, etc., were concerned, the crop was treated as far as possible exactly like the previous one.

In January, plant No. 14, a Lorillard, became infected with dropsy and though the plant grew and blossomed no fruit was picked from it. In calculating the average for the two rows of Lorillard in which this plant occurred, only the seven healthy plants were considered.

#### YIELD OF THE WINTER CROP.

A record was kept of the number and weight of the fruits picked from each plant. The first fruit was picked December 24th from the first three varieties named above. The Eclipse gave its first ripe fruit December 28th. The plants continued in bearing until April 9th when they were removed from the house to make room for the spring crop.



FIG. 4. VIEW OF THE TOMATO HOUSE TWO WEEKS AFTER PLANTING.

## MONTHLY SUMMARY OF THE YIELDS.

Variety.	No. of plants.	December		January		February		March		Apr. 1 to 9		Total		
		No. of fruits.	Weight of fruits ounces.	No. of fruits.	Weight of fruits ounces.	No. of fruits.	Weight of fruits ounces.	No. of fruits.	Weight of fruits ounces.	No. of fruits.	Weight of fruits ounces.	No. of fruits.	Weight of fruits,	
													lb.	oz.
Combination .....	8	11	25 1/4	11	32 1/4	57	180	70	243	26	75	175	34	12 1/2
Lorillard .....	8	9	23 3/4	23	63 1/2	54	172 1/2	51	178 3/4	16	64	153	31	5 1/2
Best of All .....	8	14	31 1/4	20	57 1/4	63	202 3/4	66	224 3/4	36	110 3/4	199	39	2 3/4
Eclipse .....	8	11	25 1/4	19	47	51	158 1/2	97	344	32	112 1/2	210	42	14 1/2
Combination .....	4	1	2	9	27	33	115 1/2	36	115 3/4	4	13 3/4	83	17	2
Lorillard .....	4	1	3	17	44 1/2	28	96 1/2	45	148 3/4	7	20 3/4	98	19	9 1/2
Best of All .....	4	2	4 1/2	12	39	36	127 1/4	47	151	5	18 1/4	102	21	4
Eclipse .....	4	2	4	11	29 1/4	35	106 3/4	44	148 1/4	10	40 1/4	102	20	9
Combination .....	4	1	2 1/4	9	21 3/4	42	130	38	119 1/2	6	17 3/4	96	18	3 3/4
Total .....	51	52	121 1/4	131	362 1/4	399	1289 3/4	494	1673 1/4	142	472 1/2	1218	244	15

244 lb. ÷ 51 = 4 3/4 lb. per plant.

244 lb. ÷ 174 = 1 3/8 lb. per square foot of bench.

1218 fruits ÷ 51 = 23 1/6 fruits per plant.

3919 oz. ÷ 1218 = 3 125/18 oz. average weight of fruits.

## TOTAL YIELD OF EACH VARIETY IN OUNCES.

Variety.	No. of plants.	Dec	Jan.	Feb.	March	April	Total
Combination.....	16	30	81	425 1/2	478 1/4	106 1/2	1122
Lorillard .....	11	26	108	269	327	84	815
Best of All .....	12	35	96	330	375	128	966
Eclipse .....	12	29	76	265	492	152	1015 1/2

The average yield per plant of the different varieties is as follows: Combination, four pounds, six ounces; Lorillard, four pounds, ten ounces; Best of All, five pounds; Eclipse, five pounds, four ounces.

Best of All proved to be the best variety during the short and dull days of December, January and February. The yields of the different varieties for this period were:

	Total weight.	Average per plant.	Av'ge. wt. of fruits
Best of All.....	461 oz	38 oz	3 oz. +
Lorillard.....	403 oz	34 oz	3 oz.
Combination....	381 oz	32 oz	3 oz. +
Eclipse .....	370 oz	31 oz	3 oz.

Best of All was the earliest of the four varieties as is shown by the yields for December. When the days grew longer and brighter Eclipse forged rapidly to the front in yield.

As already stated, fruits do not set during long periods of cloudy weather because the pollen does not mature. From December 21 to 31, 1901, there was a period of cloudiness without a single



FIG. 5. TOMATOES IN FULL BEARING, FEBRUARY 10, 1902.

hour of sunshine. An examination made January 3, 1902, disclosed the following :

Variety.	No. of plants.	No. of clusters.	Clusters failed to set fruit.
Lorillard.....	11	78	9
Best of All.....	12	83	11
Combination ....	12	78	13
Eclipse ..... .	12	73	15

Since a cluster will mature from three to five fruits, and four or five fruits weigh a pound, it will be seen how important is the matter of selecting varieties. These figures also emphasize the importance of hand pollination whenever the sun does shine for a few hours, in order that the per cent. of fruits may be increased.

#### SPRING CROP, 1902.

Seed of the four varieties tested in the last experiment together with Stone and Roselind were sown Dec. 26, 1901, for growing as a spring crop. The plants were potted in two and a half inch pots, January 20th, and shifted into three and one half inch pots, February 24th.

The south and north benches were prepared and planted March 25th. The remainder of the plants were shifted into four and a half inch pots and planted on the center bench April 10th. There were two rows on the south bench with the plants two feet apart in the row. On the north bench a single row was planted with the plants thirty inches apart. The centre bench was planted in the same manner as in the former experiments.

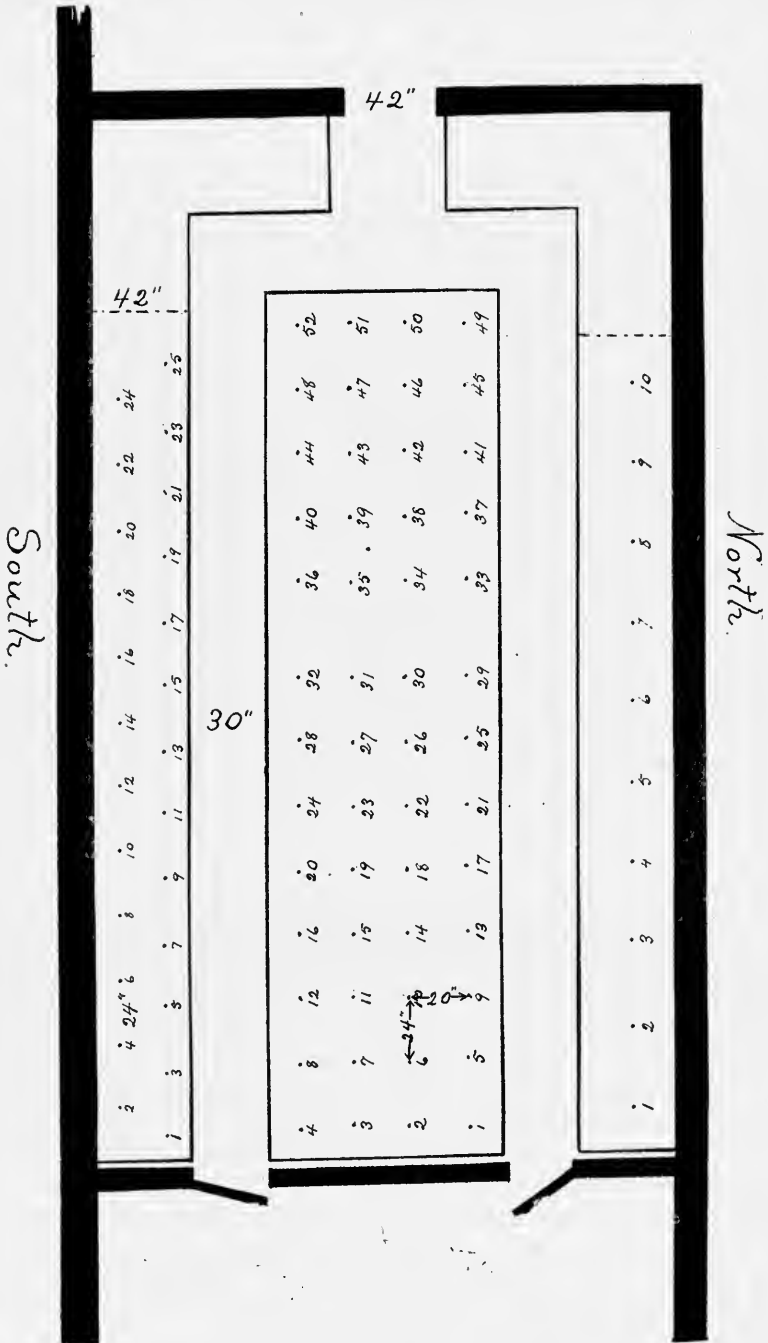


PLATE 2. DIAGRAM OF TOMATO HOUSE, MAY, 1902.

The following diagram will show the distribution of the different varieties:

YIELDS OF PLANTS ON SOUTH BENCH.

	Number.	Yield, ounces.	Average per plant.
Combination.	1	64 $\frac{1}{2}$	57 $\frac{1}{2}$
	4	60 $\frac{1}{2}$	
	14	52 $\frac{1}{2}$	
	15	55	
	24	55	
Lorillard.	7	63 $\frac{3}{4}$	62 +
	8	74 $\frac{1}{2}$	
	17	50 $\frac{1}{2}$	
Best of All.	5	66 $\frac{1}{2}$	64 +
	10	77 $\frac{1}{2}$	
	13	59	
	20	65 $\frac{1}{2}$	
	25	56	
Eclipse.	6	92	71
	9	69 $\frac{1}{2}$	
	18	62 $\frac{1}{2}$	
	21	62 $\frac{1}{2}$	
Stone.	2	61	63
	11	72 $\frac{1}{4}$	
	16	50 $\frac{1}{2}$	
	23	69 $\frac{1}{2}$	
Roselind.	3	63	65
	12	72 $\frac{3}{4}$	
	19	60 $\frac{3}{4}$	
	22	63 $\frac{1}{2}$	

The varieties on the center bench were ripening June 1st. The average yields per plant were as follows: Combination 48 ounces; Lorillard. 48 ounces; Best of All, 54 ounces; Eclipse, 55 ounces.

The average yield per square foot for the two crops was 2  $\frac{31}{81}$  pounds. The total yield of the two crops was 410 pounds, 11 ounces.

AVERAGE YIELDS PER PLANT—BOTH CROPS.

Variety.	Winter crop.		Spring crop.		Total.	
	Lb.	Oz.	Lb.	Oz.	Lb.	Oz.
Eclipse .....	5	4	3	7	8	11
Best of All.....	5		3	6	8	6
Lorillard. ....	4	10	3		7	10
Combination. . .	4	6	3		7	6

The white fly (*Aleyrodes Vaporariorum*) appeared in the spring, but Nicotocide proved successful against the pest when used according to directions.



## YIELD OF PLANTS TRAINED TO THREE STEMS.

The yields of the plants grown to three stems, on the north bench, were as follows:

1	Combination	117½ ounces.
2	Stone	141 "
3	Eclipse	113¾ "
4	Best of All	73½ "
5	Combination	125½ "
6	Lorillard	112 "
7	Best of All	89½ "
8	Eclipse	119 "
9	Lorillard	59½ "
10	Roselind	72 "

The yield per square foot was  $1\frac{6}{11}$  pounds as compared with  $1\frac{4}{11}$  pounds per square foot on the south bench planted on the same day but trained to single stems.

## MARKET.

Some may have the idea that there is no market for such products as forced tomatoes outside the great cities. Before we began growing tomatoes there were no forced products on the market here in the two towns, Urbana and Champaign, with 15,000 people. The first tomatoes to appear were from Louisiana and Texas and they were not brought in until twenty cents a pound would give a profit. So we sold our first tomatoes in March 1901, for that price and found a ready market for all we could supply. The next winter we set the price at thirty cents a pound during January and February, reducing it to 20 cents on March 1st, with greater demand than the season before. The results here have led us to believe firmly that in many other cities of the state there would be a market for forced tomatoes, cucumbers, lettuce, etc., if it were only worked up.

Whether it will pay to grow tomatoes in midwinter at the prices named is a question of locality and the man. In the spring we know that we can compete with profit in the market for tomatoes because of certain advantages. The advantages possessed by the grower of forced tomatoes are a safer climate because it is under control, a better soil, a better market near at hand where a fresher, choicer product can be furnished and where the market can be carefully watched. It is possible to force or retard the ripening of the fruit and consequently to supply extra demands for special occasions. His dealings are generally with the consumer direct, while those of the southern grower are with middlemen who demand their share. Other disadvantages of the southern grower, particularly in Florida, are erratic climate which cannot be con-

trolled ; a poor soil with varying rainfall, a distant market necessitating long transit by rail or boat with the expense of transportation and danger of loss from cold, strikes, delays, etc. Even after his product reaches its destination it may strike a dull market on account of unfavorable weather. His product must be picked before it is mature in order to stand shipment and consequently it loses in flavor. His product cannot compete with the forced tomato for the best trade and the highest price.

#### SUMMARY.

By checking the plants it is possible to secure fruit in fifty days from benching.

To secure fruit by Thanksgiving day the seed must be sown by July 20th and the plants benched not later than October 1st.

Pollen is not discharged during cloudy weather and advantage must be taken of short periods of sunshine to pollinate by hand. Since the product is most valuable it will pay the grower to pollinate by hand regularly between December 1st and March 1st. The advantages are a larger number of fruits set and larger, more uniform fruits.

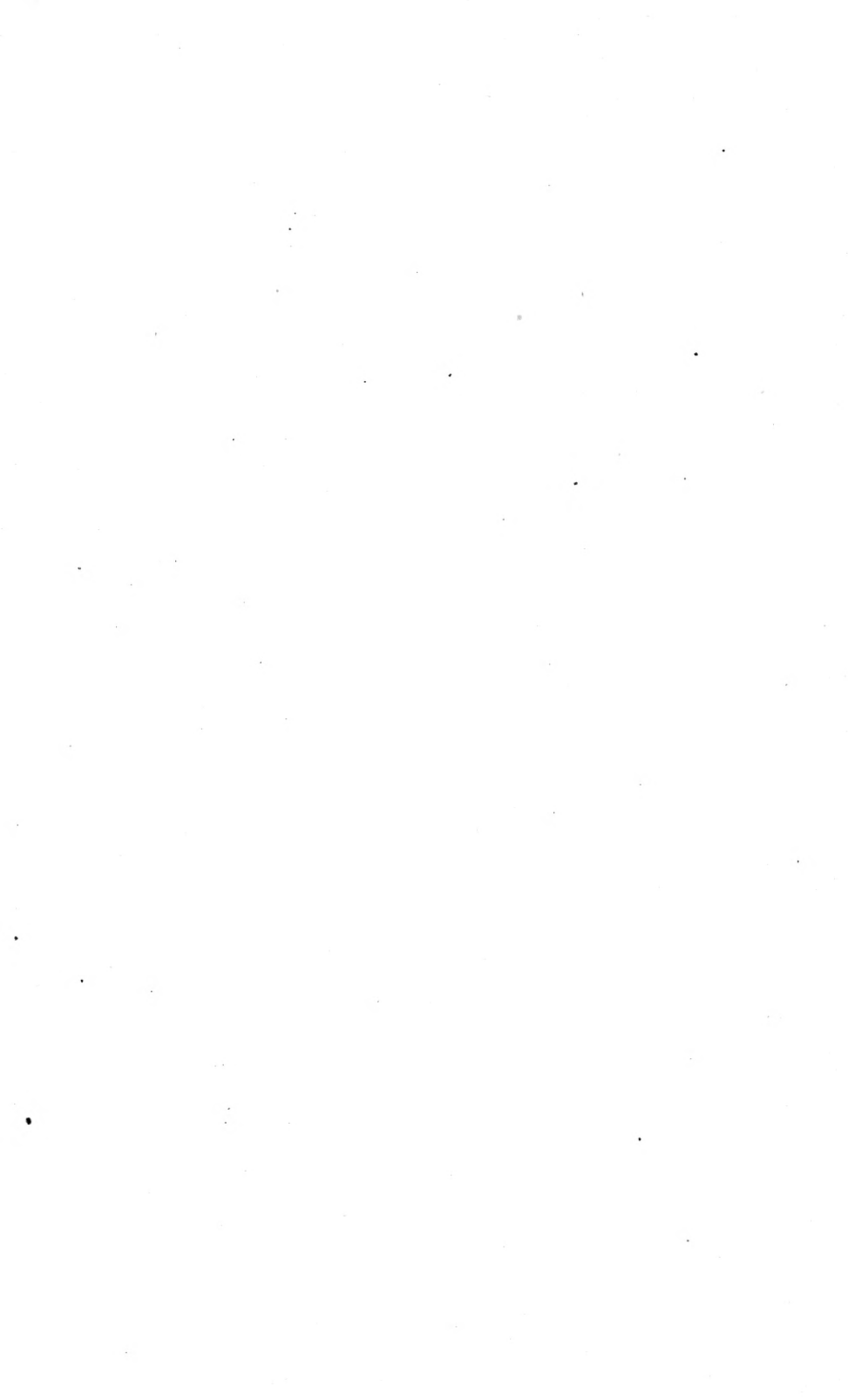
A careful selection of varieties for the midwinter crop is requisite for the greatest success. Those varieties developed under forcing house conditions like Best of All and Lorillard give the best results.

Eclipse gave the largest yields both for the winter and spring crops of 1902. It is not quite so early as Best of All, but it produced the smoothest and most solid fruits.

The yield of Yellow Prince was decidedly inferior to that of the Combination grown under similar conditions.

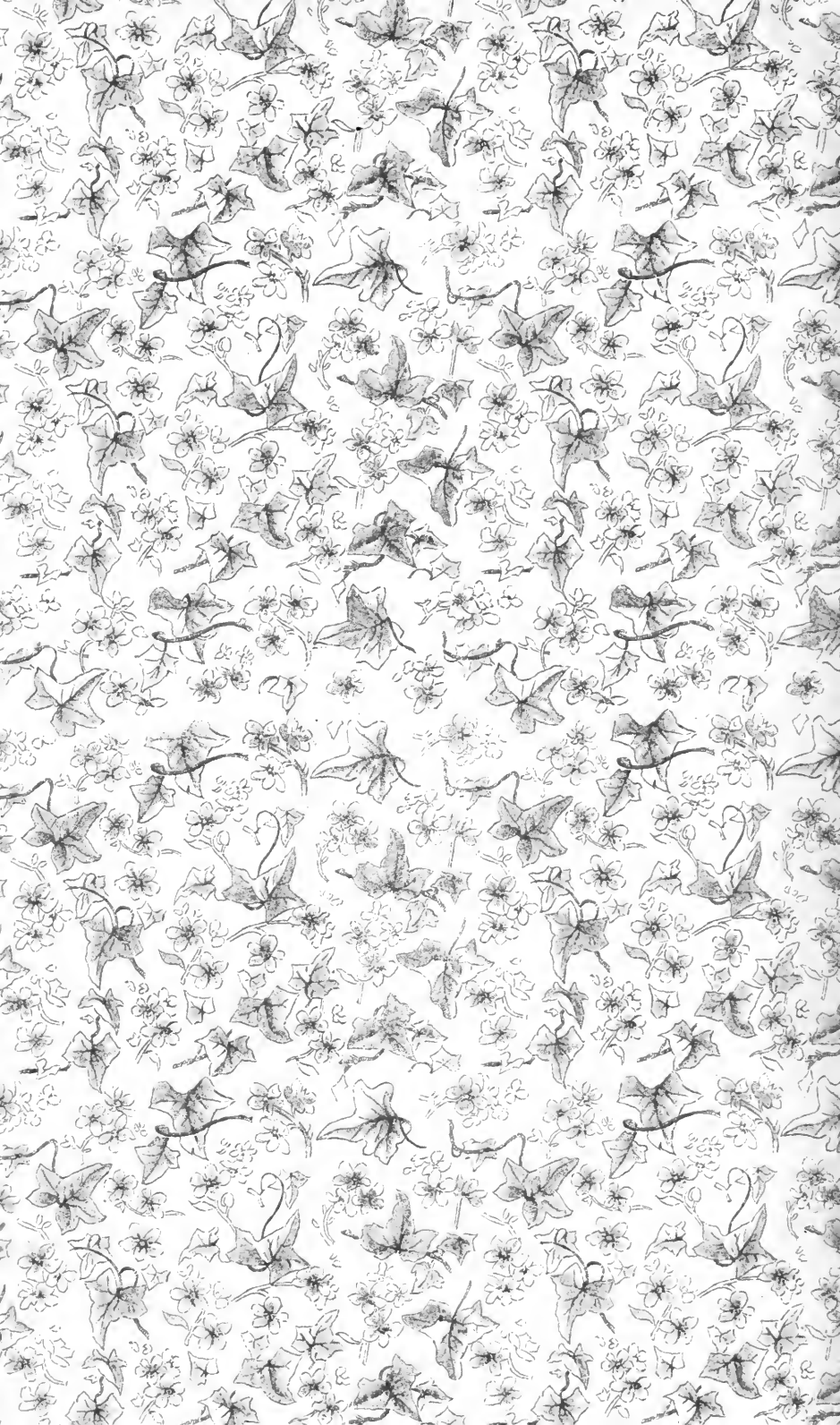
Plants trained to single stems gave a much greater yield per square foot of bench than those trained to three stems, the yield of the former being one and one-fifth pounds against four-fifths of a pound for the latter.

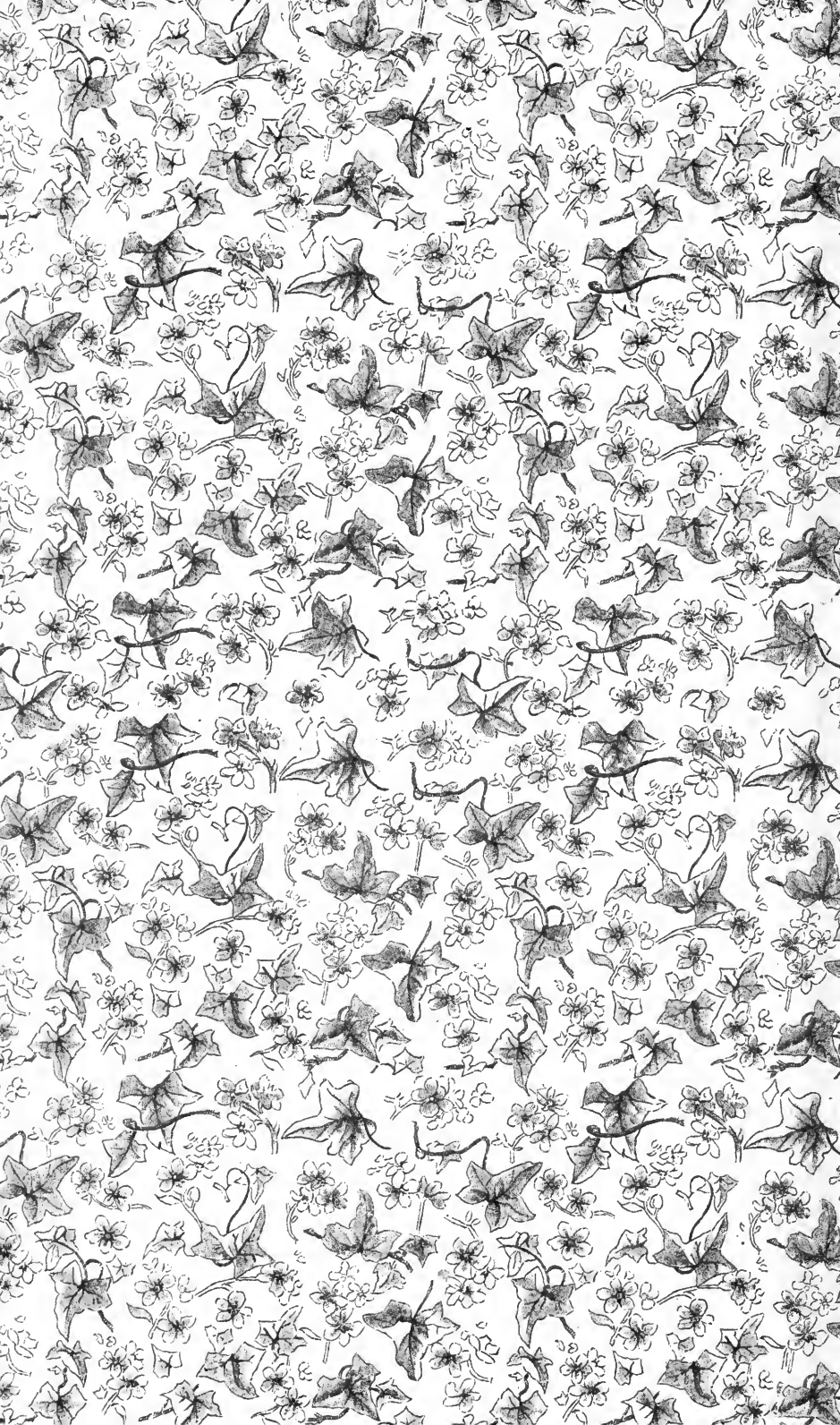
The average yield for the season, 1901-'02, including both the winter and spring crop, was from two to nearly two and one-half pounds per square foot of bench, or from seven to almost nine pounds per stem.











UNIVERSITY OF ILLINOIS-URBANA

Q.630.7/L68

C001

BULLETIN. URBANA

61-84 1901-03



3 0112 019528782