

GERTRUDE L. VAN LOO



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THESIS

The Girdling of Carnations

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1902





T H E S I S

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T H E G I R D L I N G O F C A R N A T I O N S

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THESIS

**Object:**

The object of this experiment is to determine whether the girdling of carnation stems will increase the length of the flower stems, make the flowers blossom earlier, and make the flowers larger, or not.

**Theory:**

The sap passes from the root to the leaves through the outer layer of the woody cylinder. In the leaves this sap is acted upon by carbonic acid gas and chlorophyll granules, and is transformed into plant food. This assimilated material passes downward through the inner bark to be distributed where needed. When plants are operated upon the flow of sap upward continues nearly as before the operation, but the newly made food compounds cannot pass below the injury so well, so accumulate above it and go to the formation of flowers and fruit at the expense of the other organs of the plant.

**Method Used:**

I. Two stems on the same plant each having a bud in the same development, (the buds should be just starting), were taken. One stem was girdled, that is, a band of bark quite to the woody cylinder and a half inch wide was removed with a sharp knife. The place chosen for the wound was at the beginning of the new growth. This stem

was measured from the wound to the bud. Then the other stem which was used as a check was measured from the beginning of the new growth to the bud. A careful record was kept of these measurements and the date of girdling. The two stems were labeled.

II. The stems were allowed to grow until the flowers were fully developed. Then careful measurements were again taken of the length of the stems; and the diameter of the flowers, and the dates of the blossoming of the two buds were noted.

III. The difference between the two lengths of the girdled and checked stems was found. Then the increase in the lengths of the girdled and checked stems, the time of their blossoming, and the diameters of the two flowers were compared.

#### Results:

Out of 13 varieties 9 showed the check stems to have increased most and 4 showed the girdled stems to have increased most. Out of 14 varieties 10 showed the earliest development of the buds of the girdled stems and 4 showed the earliest development of the buds of the check stems. Out of 11 varieties 7 showed greater diameter in the blossoms of the girdled stems and 4 showed greater diameter in the blossoms of the check stems.

The increase in the length of the check stem over the girdled stem varied from  $\frac{1}{2}$  to 4 inches. The buds of the girdled stems blossom from 1 to 6 days earlier than those



of the check stems. The diameters of the flowers on the girdled stems were from  $1/8$  to  $1/2$  an inch more than the diameters of the flowers of the check stems. The average gain in the length of the check stem was  $6 \frac{3}{4}$  inches. The average gain in the length of the girdled stem was  $6 \frac{1}{4}$  inches. The average time of blossoming of the check buds was 54 days. The average time of blossoming of the girdled buds was 55 days. The average diameter of the check flowers was 2.3 inches. The average diameter of the girdled flowers was 2.4 inches.

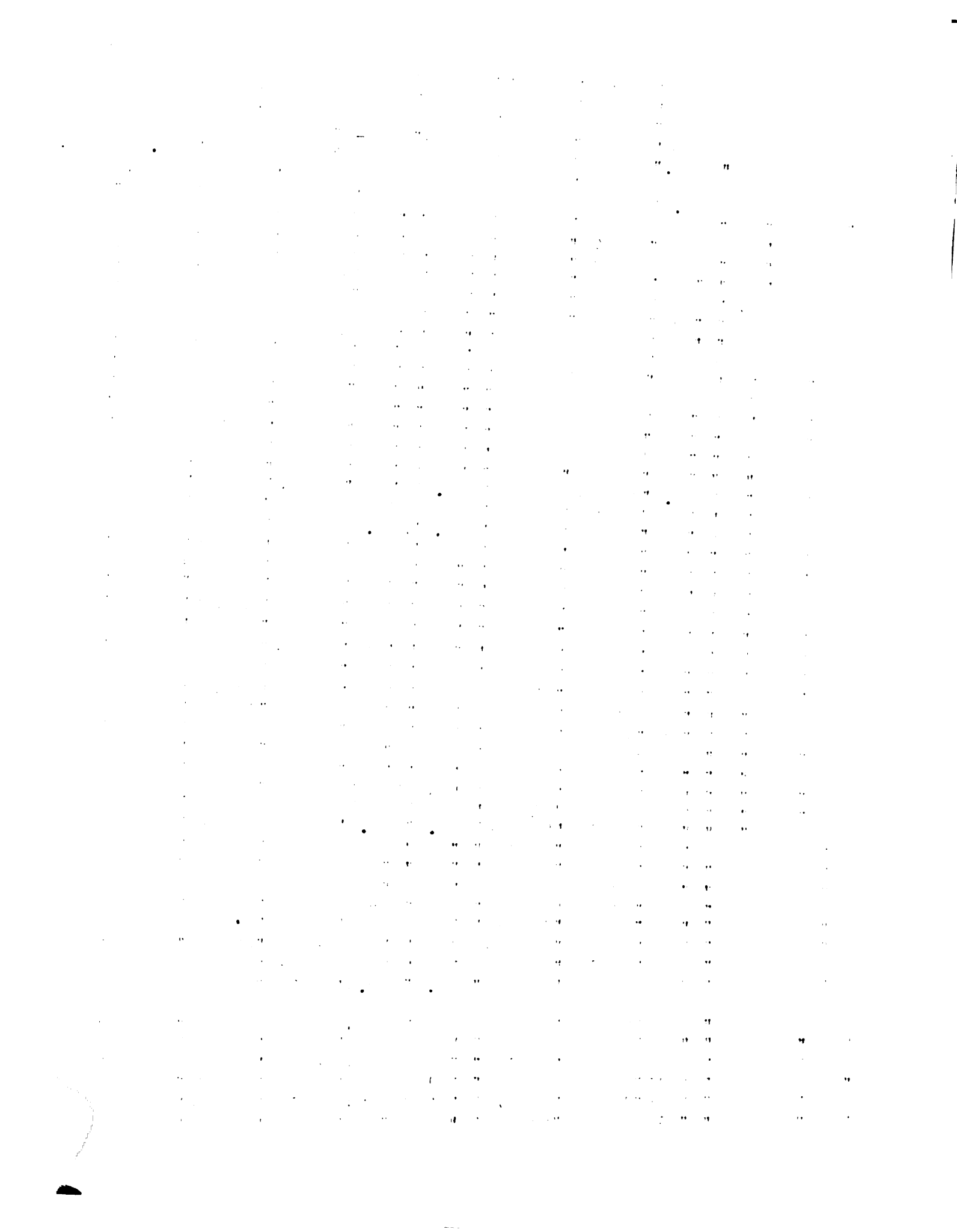
General Conclusions:

The girdling of carnations retards the growth of the stem, but makes the buds of the girdled stem develop earlier, and the diameter of the flowers larger.

		"Date"	"First"	"First"	"Date"	"of"	"2nd"	"2nd"	"Diam"	"eter"	
	"Date"	"length"	"length"	"of"	"gird"	"length"	"of"	"gird"	"check"	"led"	"of"
	"of"	"of"	"of"	"check"	"led"	"of"	"gird"	"check"	"led"	"of"	"gird"
	"gird"	"check"	"girdled"	"blos"	"blos"	"check"	"led"	"blos"	"blos"	"of"	"gird"
	"ling"	"stem"	"stem"	"soming"	"soming"	"stem"	"stem"	"som"	"som"	"som"	"som"
	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"	"Inches"
G. H. Crane	"Jan.9"	"17 1/4"	"18 1/4"	"Mar.7"	"Mar.6"	"22 1/2"	"22 1/4"	"2 1/8"	"2 1/8"	"2 1/8"	"2 1/8"
Prosperity	" " 9"	"17 1/4"	"14 1/4"	" " 12"	" " 12"	"26 1/8"	"23 1/8"	"3 1/4"	"3 1/4"	"3 1/4"	"3 1/4"
"	" " 9"	"18 1/4"	"15 7/8"	" " 14"	" " 14"	"24 1/4"	"22 3/8"	"3 1/4"	"3 1/4"	"3 1/4"	"3 1/4"
"	" " 9"	"19 3/4"	"16 1/2"	" " 18"	" " 18"	"26 1/2"	"25 1/4"	"3 1/4"	"3 1/4"	"3 1/4"	"3 1/4"
Egypt	" " 9"	"14 3/4"	"14 7/8"	" " 7"	" " 7"	"17 1/8"	"18 1/4"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 10"	"17 3/4"	"16 5/8"	" " 6"	" " 11"	"23 3/4"	"21 1/4"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 10"	"11 3/8"	"15 3/4"	" " 14"	" " 13"	"15 1/4"	"24 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	"Feb.4"	"18 3/4"	"18 1/4"	" " 31"	" " 31"	"34 3/4"	"30 3/8"	"2 3/4"	"2 3/4"	"2 3/4"	"2 3/4"
Queen Louise	"Jan10"	"12 1/8"	"11 3/4"	" " 10"	" " 7"	"18 3/4"	"17 3/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 10"	"10 1/4"	"9 1/2"	" " 24"	" " 24"	"17 1/2"	"17 1/2"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"
"	" " 20"	"16 1/2"	"17 3/4"	" " 20"	" " 20"	"20 1/2"	"22 1/2"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"
"	"Feb.4"	"14 1/2"	"10 3/4"	" " 25"	" " 25"	"20 1/2"	"18 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 4"	"16 1/2"	"18 1/2"	" " 25"	" " 25"	"25 1/4"	"23 1/2"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"
Mermaid	"Jan10"	"18 5/8"	"17 1/2"	" " 6"	" " 5"	"26 5/8"	"24 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 10"	"14 7/8"	"16 1/8"	" " 7"	" " 6"	"17 3/4"	"21 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 20"	"18 1/2"	"13 1/2"	" " 14"	" " 22"	"22 1/4"	"20 1/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	"Feb.4"	"22 1/2"	"15 1/4"	" " 24"	" " 25"	"27 1/2"	"21 1/2"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 4"	"14 1/2"	"12 3/4"	" " 22"	"Apr.4"	"20 1/2"	"23 5/8"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 4"	"17 1/4"	"19 1/2"	" " 24"	"Mar22"	"24 1/2"	"24 1/2"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 4"	"19 1/2"	"15 1/4"	" " 24"	" " 25"	"26 1/4"	"22 1/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 4"	"16 1/4"	"15 1/4"	" " 24"	" " 24"	"22 1/4"	"23 1/4"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"
"	" " 4"	"14 1/4"	"17 1/4"	" " 24"	" " 22"	"21 1/4"	"22 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 4"	"17 1/4"	"16 3/4"	" " 22"	" " 22"	"21 1/2"	"22 1/2"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 4"	"20 1/2"	"13 3/4"	" " 24"	" " 24"	"25 1/2"	"21 1/2"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 4"	"23 1/2"	"17 1/4"	" " 19"	" " 19"	"24 1/4"	"20 3/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 4"	"18 1/2"	"16 3/8"	" " 25"	" " 25"	"22 3/4"	"23 1/2"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
Bon Homme											
Richard	"Jan10"	"20 1/2"	"18 3/8"	" " 14"	" " 18"	"27 3/4"	"28 3/4"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"
Sunbeam	" " 10"	"12 1/2"	"10 1/8"	" " 8"	" " 7"	"20 1/2"	"19 1/2"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	"Feb.4"	"14 1/2"	"12 1/2"	" " 26"	" " 26"	"22 1/2"	"19 1/2"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
Gov. Roosevelt	"Jan10"	"18 1/4"	"17 3/8"	" " 8"	" " 13"	"22 3/4"	"24 1/2"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 10"	"13 1/4"	"14 1/2"	" " 13"	" " 8"	"17 1/8"	"18 1/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 10"	"17 5/8"	"14 3/8"	" " 13"	" " 18"	"23 1/4"	"25 1/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	"Feb.4"	"21 1/2"	"19 1/2"	" " 22"	" " 22"	"25 3/4"	"23 1/2"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
Lawson	"Jan13"	"16 1/4"	"18 1/8"	" " 10"	" " 7"	"20 1/4"	"18 1/4"	"2 3/4"	"2 3/4"	"2 3/4"	"2 3/4"
"	" " 13"	"13 3/4"	"9 3/4"	" " 19"	" " 19"	"23 1/4"	"20 1/4"	"2 3/4"	"2 3/4"	"2 3/4"	"2 3/4"
"	" " 13"	"13 3/4"	"9 3/4"	" " 19"	" " 18"	"17 1/4"	"18 1/2"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	"Feb.5"	"12 1/2"	"11 1/2"	" " 27"	" " 27"	"20 1/2"	"19 1/2"	"2 3/4"	"2 3/4"	"2 3/4"	"2 3/4"
Lizzie McGowan	"Jan13"	"12 1/8"	"13 7/8"	" " 8"	" " 8"	"14 3/4"	"17 1/2"	"2 1/8"	"2 1/8"	"2 1/8"	"2 1/8"
"	" " 13"	"12 3/4"	"12 3/4"	" " 8"	" " 8"	"17 1/4"	"14 1/2"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 13"	"10 3/4"	"10 3/4"	" " 12"	" " 12"	"15 1/2"	"15 1/2"	"2 3/8"	"2 3/8"	"2 3/8"	"2 3/8"
"	" " 13"	"12 1/4"	"12 3/8"	" " 15"	" " 14"	"15 1/2"	"15 1/2"	"2 3/4"	"2 3/4"	"2 3/4"	"2 3/4"
"	" " 13"	"11 1/2"	"11 1/2"	" " 17"	" " 17"	"16 1/4"	"15 1/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 13"	"5 5/8"	"6 3/8"	" " 17"	" " 17"	"10 3/4"	"10 3/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 13"	"7 5/8"	"7 3/4"	" " 10"	" " 6"	"9 3/4"	"9 3/4"	"2 1/4"	"2 1/4"	"2 1/4"	"2 1/4"
"	" " 20"	"11 1/2"	"8 1/2"	" " 17"	" " 17"	"13 3/4"	"12 3/4"	"2 1/2"	"2 1/2"	"2 1/2"	"2 1/2"
"	" " 20"	"10 7/8"	"7 5/8"	" " 17"	" " 20"	"16 1/4"	"14 1/4"	"2 5/8"	"2 5/8"	"2 5/8"	"2 5/8"



					"ling."	"Stem	"Stem	"Coming	"Inches"	"Inches"	"Inches"	"Inches"							
Lizzie McGowan	"	"	"	"	Feb. 5	"12	3/4"	8	7/8"	Mar 24	Mar 25	"14	1 1/2"	11	3/8"	2	3/8"	2	"
"	"	"	"	"	"	5	"11	3/4"	11	1/8"	"	25	"	25	"16	"15	1/4"	2	1/8"
"	"	"	"	"	"	5	"9	5/8"	10	"	"	24	"	25	"15	"14	1/4"	2	3/8"
"	"	"	"	"	"	5	"12	1/4"	12	"	"	22	"	22	"16	1/2"	14	3/4"	2 1/4"
"	"	"	"	"	"	5	"14	"	8	3/4"	"	24	"	20	"18	1/2"	11	"	2 3/8"
Gold Nuggett	"	"	"	"	Jan 13	"8	1/2"	6	3/4"	"	14	"	19	"15	1/2"	14	1/4"	2	1/2"
Ethel Croker	"	"	"	"	"	13	"17	"	16	3/8"	"	7	"	6	"18	1/2"	19	"	2 1/2"
Daybreak	"	"	"	"	"	14	"10	3/4"	11	5/8"	"	3	"	3	"12	3/4"	14	"	2 1/4"
Mixed Varieties	"	"	"	"	"	14	"10	"	8	1/8"	"	17	"	17	"15	"13	"	2	1/4"
"	"	"	"	"	"	14	"13	1/8"	12	1/8"	"	13	"	13	"16	3/4"	15	5/8"	1 7/8"
"	"	"	"	"	"	20	"10	1/8"	12	3/8"	"	17	"	17	"13	1/2"	17	"	1 3/4"
"	"	"	"	"	"	20	"10	3/8"	11	"	"	25	"	24	"19	1/2"	18	1/4"	1 7/8"
"	"	"	"	"	"	20	"18	3/8"	12	1/8"	"	24	"	22	"28	"17	1/2"	2	3/8"
"	"	"	"	"	"	20	"12	"	10	1/4"	"	24	"	24	"18	1/4"	16	3/4"	"
"	"	"	"	"	"	20	"8	1/2"	7	1/2"	"	17	"	17	"13	"13	"	2	1/4"
"	"	"	"	"	"	Feb. 5	"10	1/4"	8	3/4"	Apr. 4	"	31	"17	1/8"	14	7/8"	2	1/4"
"	"	"	"	"	"	5	"14	1/4"	14	1/4"	Mar 31	"	31	"18	1/4"	19	3/8"	2	1/4"
"	"	"	"	"	"	5	"13	1/4"	10	1/2"	Apr. 7	Apr. 7	"21	7/8"	17	3/4"	2	"	2 1/4"
"	"	"	"	"	"	5	"13	1/4"	9	7/8"	Mar 24	Mar 24	"16	"12	1/2"	1	7/8"	1	3/4"
"	"	"	"	"	"	5	"13	1/2"	11	1/4"	"	26	"	26	"17	3/4"	15	"	2 1/8"
"	"	"	"	"	"	5	"14	"	14	3/4"	"	31	"	31	"20	3/4"	21	1/2"	2
"	"	"	"	"	"	Jan 14	"11	3/8"	10	"	"	8	"	7	"12	1/2"	13	1/2"	2
"	"	"	"	"	"	14	"6	1/2"	5	1/2"	"	22	"	17	"13	1/2"	12	1/2"	2 1/2"
"	"	"	"	"	"	14	"15	"	9	"	"	18	"	22	"19	1/4"	13	"	1 7/8"
"	"	"	"	"	"	14	"15	1/8"	15	1/8"	"	17	"	13	"20	1/2"	19	1/4"	2
"	"	"	"	"	"	14	"16	1/2"	21	1/4"	"	3	"	3	"20	"24	1/2"	2	1/4"
"	"	"	"	"	"	14	"12	3/8"	9	5/8"	"	10	"	5	"16	1/2"	13	"	2 3/8"
"	"	"	"	"	"	21	"12	1/2"	9	3/8"	"	14	"	10	"16	3/4"	12	"	2 1/4"
"	"	"	"	"	"	Feb 10	"10	"	10	"	"	31	"	26	"17	1/2"	14	"	2 1/4"
"	"	"	"	"	"	10	"12	"	10	1/2"	"	24	"	25	"16	1/2"	14	"	2 1/4"
"	"	"	"	"	"	10	"15	"	13	3/8"	"	24	"	25	"21	"15	"	2 1/8"	2 1/8"
"	"	"	"	"	"	10	"15	1/4"	11	1/2"	"	27	"	24	"20	"16	"	2 3/8"	2 1/4"
#Egypt	"	"	"	"	"	17	"29	5/4"	21	3/4"	Apr. 7	Apr. 7	"42	1/8"	31	7/8"	2	3/4"	2 3/4"
"	"	"	"	"	"	17	"20	"	14	1/2"	"	11	"	11	"32	"25	"	2 1/4"	2 1/4"
"	"	"	"	"	"	17	"24	3/4"	19	1/2"	"	11	"	11	"33	1/2"	31	1/2"	2 1/8"
"	"	"	"	"	"	17	"27	1/4"	24	3/4"	"	9	"	7	"37	"34	7/8"	2	1/2"
#Sunbeam	"	"	"	"	"	Jan 16	"14	5/8"	13	1/8"	Mar 24	Mar 22	"23	3/4"	21	1/2"	2	5/8"	2 1/4"
"	"	"	"	"	"	16	"19	"	15	3/4"	"	17	"	17	"25	"21	3/4"	2	3/8"
"	"	"	"	"	"	21	"20	"	19	3/4"	"	14	"	14	"24	1/4"	23	"	2 1/4"
"	"	"	"	"	"	Feb 11	"20	1/2"	17	1/2"	"	31	"	31	"26	7/8"	23	1/4"	2 3/4"
#Bon Homme	"	"	"	"	"	17	"19	"	16	1/2"	Apr. 4	Apr. 4	"28	7/8"	22	7/8"	2	1/2"	2 1/2"
Richard	"	"	"	"	"	Jan 15	"28	"	27	1/8"	Mar 17	Mar 16	"36	"	33	1/2"	2	3/8"	2 1/2"
"	"	"	"	"	"	15	"24	7/8"	23	7/8"	"	18	"	17	"33	"31	"	2 1/4"	2 1/4"
"	"	"	"	"	"	15	"22	"	21	1/2"	"	17	"	14	"36	"28	"	2 1/4"	2 3/8"
"	"	"	"	"	"	15	"26	1/2"	24	"	"	18	"	24	"30	"29	1/2"	2	1/2"
"	"	"	"	"	"	15	"19	"	17	1/4"	"	24	"	24	"29	1/2"	27	1/4"	2 3/8"
"	"	"	"	"	"	15	"22	3/4"	21	"	"	18	"	17	"32	"28	1/2"	2	3/8"



# These were growing in the side-hill forcing house.



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