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# Garden Notes, with Table of Meteorological Observations

C.A. Keffer  
*Dakota Agricultural College*

L. McLouth  
*Dakota Agricultural College*

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AGRICULTURAL COLLEGE,  
AND  
EXPERIMENT STATION,  
BROOKINGS, DAKOTA.

Bulletin No. 5.

OCTOBER, 1888.

DEPARTMENT OF FORESTRY, HORTICULTURE AND BOTANY.

*GARDEN NOTES, With Table of Meteorological Observations,*

OFFICERS OF THE  
Experiment Station.

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This Bulletin is offered to the farmers and gardeners of the Territory with the hope that they may find it valuable at least in suggestions. It is believed that as time enables us to perfect our plans and methods of work the value of our bulletins will be greatly increased. Other Bulletins upon forestry, fruit growing, corn culture, extermination of insect pests, analysis of water and seeds, will speedily follow.

Accompanying this bulletin are meteorological tables that may be of value as throwing light upon the facts herein noted.

Any farmer in the territory who desires the bulletins of the station can have them mailed free to him by sending in his address. The press of the territory can do a favor to the station and to the people by giving this notice wide publicity.

Correspondence is also invited upon any question relating to farm interests. Questions relating to farm crops or stock should be addressed to Professor Foster; questions relating to tree culture or to gardening should be addressed to Professor Keffer; questions relating to insects should be addressed to Dr. Orcutt; questions concerning the chemical composition of soils or waters should be addressed to Professor Shepard, and questions about the diseases of animals and their treatment should be addressed to Dr. Alloway,—all at Brookings, Dakota.

LEWIS McLOUTH, Director.

# DEPARTMENT OF Forestry, Horticulture and Botany.

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CHAS. A. KEFFER, Superintendent.

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## GARDEN NOTES.

The following notes are presented as showing something of the action of well known vegetables in the Garden of the Experiment Station. Several varieties of each vegetable were planted to get an estimate of their relative value. Some of the products of the garden were used in the boarding halls of the College, and hence it is impossible to give an accurate statement of the yield of such vegetables.

It is gratifying to know that the prairie soil of Dakota seems peculiarly adapted to the growth of almost all kinds of garden vegetables. Not only the more common favorites, but celery and cauliflower reach perfection in our soil.

The land devoted to gardening had been cultivated three years. The first two years it was planted to grain; last season it was occupied by hoed crops. No manure has been used until the present year, and only as indicated in the notes. The land was plowed about eight inches deep in the autumn of 1887, and was again plowed last spring, going ten inches deep. After plowing the land was kept in the finest condition, save in one instance, by frequent harrowing until the garden crop was planted.

Most of the vegetables were planted on a western slope, with a southern exposure. The corn and cabbage occupied the eastern slope of the same ridge. All the land was thoroughly drained.

There were no long continued dry periods during the season just closed, so that the great question of cultivation as a means of over-



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coming drouth was not an open one. The culture given was sufficient to keep the soil mellow throughout the growing season.

**RADISHES.**—This vegetable is too well known to require comment. French Breakfast and Long Scarlet Strap Leaf proved excellent early sorts, both small. Of the later kinds the White Vienna, a summer radish, was excellent throughout July; it remains a long time in good condition for eating, solid, without pith and of good size. Chartier did not succeed well; the roots were stringy and the plants quickly developed flower stalks.

No difference was observed in several strains of Long Scarlet radish.

**LETTUCE.**—So many excellent varieties of this vegetable are now offered that it is hard to find an inferior sort. Of the following varieties tested, Bloomsdale Reliable, Hanson, Curled India, Early Curled Silesian, Landreth's Earliest Cutting, the Hanson proved best. It is good for use when quite small, and if properly thinned the remaining plants give compact heads which are blanched to a creamy yellow at the center, and have in a peculiar degree the buttery quality so much prized in this vegetable.

Bloomsdale Reliable is also an excellent head lettuce. Curled India differs but slightly from Hanson. Landreth's Earliest Cutting is better than Silesian and slightly earlier.

**SPINACH.**—Landreth's Savoy Leaved was sown April twentieth; all up May fourteenth, and the first picking was made June twelfth. It sent up a seed-stock almost immediately, blooming June eighteenth. As only the leaves of this vegetable are used, the variety seems not of the best.

Long Standing, planted the same day, and up at the same time, was not ready for use till June fifteenth, but remained in good condition for use longer, the buds appearing June twenty-fifth. The leaves of this variety were larger and the growth stronger than the last.

**BEET.**—Three varieties of turnip beet were tested, and they vary so little in season, quality and yield, that any one will be found to fill all requirements. For winter use beet seed should be sown late. Roots three inches in diameter are better for cooking than the very large ones and late plants keep better than the early ones.

Early Blood Red. This variety was sown May twelfth and all were up May twentieth. On July fifth they were large enough for use as greens. The first roots were used July eleventh. Eclipse and Egyptian, sowed the same day, were ready for use about the same time and developed no especial characteristics.

**SALSIFY.**—This vegetable grew excellently but on digging the roots, October fifteenth, they were found to branch badly; possibly extra deep plowing might prevent this difficulty. It is an excellent vegetable for thickening soups or for cooking like parsnips.

**PARSLEY.**—Both varieties tested, Double Moss Curled and Fern Leaved, made fine growth during the season.

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**EGG PLANT.**—Plants of New York Improved and Large Purple, transplanted from the hot bed June twenty-eighth, did not mature fruit before frost. The seeds were sown in the hot beds April eighteenth, but were slow to germinate and the young plants grew very slowly. Probably there was not sufficient heat, as the egg plant requires a high temperature.

**PEPPER.**—Chili Red, Bull Nose. The seeds of both varieties were planted in hot beds April eighteenth and all were germinated by May seventh. The plants were set in open ground June twenty-eighth and grew well, setting a good crop of fruit. The killing frost of September eleventh found the fruits of both varieties well developed, but only beginning to ripen. The Chili is a small red pepper. The Bull Nose is a very large sort, much used for pickles.

**ONIONS.**—Red Weathersfield, Silver Skin, Extra Early Red, Yellow Danvers and McKay's Red, were tested. A heavy dressing of thoroughly rotted manure was applied to the soil, and harrowed in with an Acme Pulverizer, making it of finest tilth. The seed of all varieties was sown in drills May twelfth and a good stand was secured. They were cultivated with a McGee wheel hoe, and were thinned but little, it being the intention to use the thinnings when large enough to eat. This plan was followed throughout the summer, hence the yield can only be considered comparatively. Early Red was not so large, and matured no earlier than Red Weathersfield, the standard red variety. White Globe is a good cropper, but does not mature so early as Silverskin, and is rather stronger. Yellow Danvers is an excellent cropper, matures second to Silverskin and before Weathersfield. It is a better keeper and a larger onion than Silverskin, and though not as large as the Weathersfield is much better in quality. McKay's Red, received from the Department of Agriculture, matured prematurely and did not seem well adapted to the soil.

**CAULIFLOWER.**—Henderson's Snow Ball and Haskell's Favorite were sown in hot bed April tenth but very few of the seeds germinated. The plants were set in well manured ground the twenty-fourth of May. The first cauliflower was pickled July thirteenth and the plants continued heading at intervals throughout the season. No difference could be observed between the varieties. The cauliflower is regarded as one of the most delicate vegetables, and should be extensively grown.

**ENDIVE.**—Two varieties, Moss Curled and Green Curled, were sown the first week in July and made fine growth. The second week in September they were hilled up for blanching, and in ten days the central leaves were a creamy white color. Endive is one of the most beautiful salad plants grown. When properly thinned while young, and blanched like celery, its finely divided leaves have the flavor of well grown lettuce. It must be well blanched to be good. It can be stored for winter use like celery.

**BEANS.**—The following summary of notes on beans will give an idea of the relative nature of the varieties tested:



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OKRA.—This vegetable is not as well known as it should be in the northwest. Both varieties tested, Dwarf and Long Green, grew well and bore heavily. The seeds were sown May twelfth and the young pods were ready for use the first week in August. The vegetable is used for flavoring soups, the young pods being cut into thin slices, or when somewhat older, only the seeds being used.

PARSNIP.—Two varieties were grown, Bloomsdale Sugar and Hollow Crown. No marked difference in size or quality was observed, both sorts growing well and producing good medium sized roots—the best for culinary use. The seed was sown May ninth and the crop dug October fifteenth. Parsnips grown in the garden during the season of 1887 remained in the ground over winter without injury. They are the better for this treatment.

CARROT.—Chanteney Scarlet, Extra Early Forcing, Long White Belgian, Early Scarlet Horn, Danver's Half Long, Long Orange, were tested. The seeds were planted May ninth. On July sixteenth the Extra Early Forcing was ready for use, followed by Chanteney, Early Scarlet Horn, Danver's, Long Orange and White Belgian. For cropping the Long Orange and Danver's are both excellent.

CUCUMBER.—Seeds of Landreth's Choice, Early White Spine, Jersey Pickle, Boston Pickle, Long Green Turkey, were sown the latter part of May on a gravelly knoll, in hills prepared by mixing manure with the soil. The plot chosen was probably the warmest in the garden, but the plants did not grow well, and none of the varieties produced well formed fruit.

SWEET CORN.—Corey, Early Minnesota, Stabler's Early, Egyptian, Amber Cream and Stowell's Evergreen were planted the latter part of May and were ready for use in the order named. Corey is an excellent first early corn. It was entirely ripe by the time Stowell's Evergreen was ready for use. It was about ten days in advance of Early Minnesota, which is somewhat larger but not better in quality. Amber Cream and Evergreen are both first class in quality, being very sweet and continuing a long time in good condition for eating. Heavy frosts came while the two sorts were in the milk but owing to the thickness of their husks they withstood quite a severe freezing.

SQUASH.—Marblehead, Early Prolific Marrow, White Bush Scalloped, Summer Crookneck, New Egg Plant, Sibley, Essex Hybrid, Hubbard. Of the aboved named varieties, the Summer Crookneck and White Bush Scalloped are the earliest, followed closely by New Egg Plant, which is a summer squash, but not so watery as the two first named. Of the marrow squashes, Hubbard proved best in quality and a good bearer; the Sibley is a prolific variety of excellent quality, smaller in size than Hubbard; Marblehead produced the largest squash of any variety tested; the Essex Hybrid did not do well, only a few fruits appearing, and all of small size; Early Prolific Marrow is a good bearer, but quality inferior to Hubbard, Sibley or Marblehead.

VARIETY.	PLANTED.	FIRST UP.	ALL UP.	BLOSS' MED	READY FOR USE.	QUALITY.	YIELD.	REMARKS.
Brown Speckled Valentine	May 12	June 2		July 22	Aug. 1	Very Good	Excellent	An excellent market sort for second crop.
Detroit Wax	May 21	June 2		July 5	July 21	Very Good	Good	Not superior to three following.
Dwf Golden Wax	May 9	May 31	June 2	July 2		Good	Very Good	Standard yellow snap.
White Wax	May 21	May 31	June 2	July 7	July 21	Best	Excellent	Good for market or home.
Landreth's Dwarf German Wax	May 12	May 21	June 2	July 6	July 21	Good	Excellent	A good market crop.
Landreth's Sc'rlet	May 9	May 31	June 4	July 10	July 25	Best Green	Good	Not specially valuable here.
Landreth's First in Market	May 9	May 31	June 2		July 21	Fair	Very Good	Not specially valuable.



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PEAS.—The varieties tested were Landreth's Extra Early, McLean's Advancer, Eugenie, Yorkshire Hero and Stratagem. All the varieties were planted April twentieth and twenty-first in rows thirty inches apart. All were up by the fourteenth of May and pods were formed in the following order: Extra Early, June seventh; McLean's Advancer, June sixteenth; Eugenie, June twenty-first; Yorkshire Hero, June twenty-eighth; Stratagem, June twenty-ninth. In maturing the Extra Early was more rapid than the others, being ready for use June twenty-fifth; McLean's Advancer, July second; Stratagem, July sixteenth, with the others in order between the two last.

As to profit, the Extra Early has many of the points of a first early variety. It is of excellent quality, tho' not so good as the wrinkled varieties, is a good bearer and the pods are well filled. McLean's Advancer is two weeks or more later, but is of very much finer quality, several good judges ranking it best of the varieties tested. The pods are not large but are well filled with good sized peas, and the vines are very productive. Yorkshire Hero proved to be the most productive variety tested, but the pods did not fill well. This may have been due to dry weather during the blossoming season. The peas are very large and, while young, sugary, and they harden slowly, making it a first rate late market sort. Stratagem bore very large pods, but the plants were not able to perfect all the pods set. The peas are of the largest size and best quality, very sweet; the pods did not fill well, and the crop was not at all what the great profusion of blossoms promised. It is a first-class sort for the home garden, but not so profitable as Yorkshire Hero. The last named sort can be substituted in all cases, for Eugenie, which displayed no especial merit.

During the last week in July mildew struck all the peas, and soon entirely covered leaves, vines and pods with fine white filaments. The late plantings were entirely destroyed, and the first plantings were so injured that any estimate of the entire crop was rendered of little value.

TOMATO.—The following varieties of tomato were sown in hot bed April tenth: Livingston's Beauty, Livingston's Acme, Vaughan's Alpha, Vaughan's Advance, Vaughan's Early Conqueror, Ferry's Extra Early, Ferry's Conqueror, Livingston's Golden Queen, Vick's Hubbard's Curled Leaf, Department of Agriculture's Bermuda, Vick's Gen. Grant, Livingston's Perfection, Livingston's Potato Leaf, Dwarf Champion, Boston Market, Livingston's Favorite, Vaughan's Turner Hybrid, Landreth's Peach, Canada Victor, Ferry's Optimus, Livingston's Paragon, Landreth's Bermuda.

When about two inches high they were transplanted into shallow boxes, twenty-four plants in each box, the plants standing two inches apart. This was done the last week in April and the first week in May. During the month of May the plants were gradually hardened, by giving an increased amount of air daily, and finally leaving the hot-bed sash off entirely. They were set in the garden May thirty-first to June third in a high gravelly place, with a southern and western slope. The ground was in fine tilth when the plants were set, and it was kept mel-

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low and free from weeds throughout the growing season. Cut worms began taking the plants shortly after they were set and to save them a tin can, both ends of which had been melted off, was placed over each plant and fixed into the ground. The plants grew rapidly, but through an oversight the tins were not removed in time and the wind brushed the young plants against the sharp edges, cutting their stems badly near the ground. There is no doubt but that all were set back by this accident. As all varieties seemed equally injured however, the relative outcome of the season's growth was probably not changed.

The only varieties that ripened fruit before the first heavy frost, September eleventh, were Ferry's Extra Early, Bermuda, Conqueror, Advance, Golden Queen, Optimus, Canada Victor, Dwarf Champion, Alpha, Early Conqueror. From all these fruits had been picked on or before September sixth, the first having been gathered August thirty-first.

Of the varieties named above, Extra Early, Bermuda, Conqueror, Advance, Canada Victor, Early Conqueror and Alpha belong to the class of ribbed fruits, being more or less uneven, and much less "meaty" than the fruits of Golden Queen, Optimus, and Dwarf Champion. The latter variety grew very poorly during the early part of the season, so that its fruiting was probably delayed. The fruit is round, smooth, very firm and of excellent variety, resembling the Perfection and Acme in shape, but evidently somewhat earlier. After the heavy frost of September eleventh vines of each variety were pulled and weighed, to determine the relative quantity of vine and fruit. The result gives a very clear idea of the fruitfulness of the several varieties named:

VARIETY.	NUMBER OF PLANTS..	WEIGHT OF FRUIT.	WEIGHT OF VINES.	REMARKS.
Gen. Grant	5	34	lbs 26½ lbs	Fruit ribbed; no especial value.
Bermuda	5	48	“ 36 “	Ribbed fruit, one of the earliest.
Canada Victor	5	33½	“ 26 “	Ribbed fruit, early, quality poor.
Beauty	5	21	“ 32½ “	Smooth, fine quality, but late.
Acme	5	26	“ 39 “	A standard sort East.
Paragon	5	19½	“ 36 “	Among the latest.
Peach	3	10½	“ 9 “	Fruit small, early; no special value.
Ferry's Extra Early	5	44½	“ 14 “	Ribbed fruit; earliest, prolific, quality poor.
Optimus	5	28½	“ 29½ “	Smooth, very good, early.
Perfection	5	24	“ 29½ “	Smooth and good, but too late.
Favorite	5	28½	“ 40 “	Too late.
Conqueror	5	51½	“ 23 “	Early, poor quality, prolific.
Golden Queen	5	29	“ 39 “	Yellow, large and smooth.
Alpha	5	17	“ 25 “	Medium season; no especial value.
Advance	3	7	“ 16 “	Not prolific; early, poor quality.
Turner's Hybrid	4	8	“ 19½ “	Poor bearer; late.
Dwarf Champion	5	14	“ 26 “	Fruit smooth, good, not large.
Boston Market	4	13	“ 30 “	No especial value.



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It is to be very much regretted that the plants under observation suffered accident during their earlier growth, for the results secured are defective; the experiment will be tried again the coming season with an increased number of varieties.

**CELERY.**—Varieties tested, White Plume, Henderson's New Rose, Henderson's Half Dwarf. The seed of all varieties were sown in a hot bed April eleventh. The sash was covered closely with boards and the bed was kept damp, but the seed did not germinate until May thirteenth over a month from planting. A very few seeds, in the wettest part of the bed, germinated in ten days, but the rest showed no signs of growing till the date named. After germinating the young plants grew rapidly and were transplanted in a cold frame, whence they were planted in the open ground when well rooted. The plat chosen for celery is at the bottom of a long slope, where the soil is rich, deep and moist. All the varieties were planted on the same day, in rows six feet apart, the plants eight inches apart in the row. The roots were slightly pruned before setting, and the tops were cut back. The plants were set with a steel dibble. The culture consisted of frequent hoeings, and the plat was cultivated four times with a harrow tooth cultivator; the soil was kept well stirred throughout the growing season. White plume grew best, New Rose following and the Half Dwarf was rather slender in growth.

The blanching was begun the first week in September. The ground was first cultivated until of the finest tilth; then the soil was drawn close to the growing plants, the leaves of which had, by this time, grown so large as to make a continuous row with a spread of about eighteen inches; next the plant was grasped so as to hold the leaf-stalks upright, and with the other hand the earth was pressed firmly against the stalks, so that when released they remained close together and upright. To do this most quickly the workman straddled the row, working backward. After all had been thus handled, the earth was brought up with the hoe as high against the stems as it would lie. The row thus prepared presented a steep slant of earth on either side, the tips of the leaves appearing along the top. Care was taken that no lumps of earth fell in among the young leaves at the center of the plant as that would have hindered the growth of the new leaves. Three times during the month of September the hilling was renewed. Each time the ground between the rows was first well cultivated, and in that way plenty of fine soil was secured for hilling up, which was done entirely with the hoe. The White Plume was the first to blanch and the New Rose last. White Plume made the best growth and has the best flavor up to this time. Many varieties of celery do not reach perfection till quite late in winter, and both New Rose and Half Dwarf, being evidently later than White Plume, will probably be at their best during the winter.

The celery has been in use since the twentieth of September; it was dug in quantities as needed, and when the heavy frosts began the rows were well covered with grass. The celery plant stands light frosts without protection and with the covering of grass the plants

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stood well until the second week in October, when the crop was dug and stored in a cool cellar for the winter. In digging, all earth that would adhere was left on the roots. About two inches of garden soil was spread on the cellar floor and the roots were placed in this, the plants being crowded as close together as possible. The roots were just covered with soil, none being placed on the stems. The plants were arranged in short rows between two boards about a foot apart and a foot high. In such small masses there is the least danger of heating. After having sold 400 plants at \$4 per hundred there remain 400 fine plants for storing. This result was from six rows, 156 feet long, covering a little more than one-eighth of an acre. An acre at this rate would be worth \$250. The method of culture, blanching and storing, has been given here in full, as it seems to be generally supposed that there are secrets in celery culture. If the celery crop proves as successful every year as it has been the present season it will prove one of the most profitable for the Dakota gardener.

**CABBAGE.**—Extra Early Jersey Wakefield, Henderson's Early Summer, Flat Dutch, Marblehead Mammoth, Red Dutch, Fotler's Improved Brunswick, Warren, Hard-Heading, All Seasons, were the varieties tested. Of these the seeds of Extra Early Jersey Wakefield and Henderson's Early Summer were sown in hot bed for the early crop, and the remainder were planted in a well prepared seed bed in the open air.

Jersey Wakefield and Early Summer were sown April tenth and transplanted into the garden May twenty-first. They were kept perfectly clean, and the ground was in the best condition throughout the season. A second planting of these varieties was made May twenty-third. This lot was planted in heavily manured soil and the first lot was placed in unmanured ground. There was no noticeable difference in the two lots, either in size, earliness or quality. The early cabbages were but little troubled with insects, the greatest damage being by cut worms. Jersey Wakefield was ready for use July twenty-eighth; the first heads of Henderson's Early Summer were used August third. Both headed well, scarcely a plant failing.

Two plantings of late cabbage was made. One plat consisted entirely of Flat Dutch, and the other consisted of the following varieties, quantities named: 160 Fotler's Improved Brunswick, 160 All Seasons, 160 Red Dutch, 1280 Marble Head Mammoth, 80 Hard Heading, 160 Warren.

The seed of all the late varieties was sown in the open garden in rows fifteen inches apart, on May ninth. They were well cultivated with a wheel hoe and were transplanted the week of June twenty-seventh, in rows four feet apart, the plants standing three and one-half feet apart in the rows. They were set with a dibble, the plants being carried in a bucket partly filled with water, to prevent the drying of the roots.

The plat on which the Flat Dutch was planted had been previously set to tomatoes and beans, which had been destroyed by cut worms. The soil was in the best possible condition, having been repeatedly



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harrowed with an Acme pulverizer. The plat on which the remaining varieties were placed was not in as good condition, not having been previously planted, and having received less care. This fact should receive due weight in comparing results.

Neither plat had ever been manured; last season a good potato crop was taken from the Flat Dutch plat, and on the other corn was grown. The same culture was given both plats after setting. During the week after planting 2615 cut worms were removed from the two plats. The following table will be of interest:

DATE.	NO. OF PLANTS EXAMINED.	NO. OF PLANTS FOUND CUT.	NO. OF WORMS FOUND	TIME SPENT.
June 27	700	60	447	5 hours.
" 28	1500	81	555	9 "
" 29	1000	93	581	8 "
" 39	1300	124	1027	10 "
July 6			5	4 "
Totals	4500	358	2515	36 hours.

It will be seen that the cut worm nuisance was a serious evil. The plants were replaced and grew without serious check. The crop suffered but slightly from other insect ravages. The cabbage worm was not abundant, but many plants were badly infested with lice, which, however, did not seriously retard growth. During the season all varieties were hoed three times, and cultivated three times with the harrow tooth cultivator. The culture was sufficient to keep the plants in fine growing condition. The Flat Dutch grew more rapidly than the others, owing, doubtless, to the condition of the soil at planting time.

During the week beginning October nineteenth sound heads of all varieties were gathered. The following summary gives the results:

NAME.	NO. PLANTED.	SOLID HEADS.	SOFT HEADS.	DIED OR NOT HEADED.
Fotter's Improved	160	19	25	116
All Seasons.	160	55	34	71
Red Dutch.	160	58	0	102
Hard Heading.	80	17	3	60
Warren.	160	17	8	135
Marblehead.	1280	14	29	1237
Flat Dutch.	3773	1300	1299	1164

It will be seen that the date of planting, about the time usually chosen for setting late cabbages in Central Iowa, was not early enough to secure the best results here. Marblehead Mammoth, a cabbage of the largest size when well grown, made the poorest showing of any of the varieties planted. It was much later and at no time during the



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season did it grow so well as others. All Seasons does not seem to be a well established variety; there was quite a noticeable variation among the plants. The Warren did not show any specially good points.

Referring now to the Flat Dutch plat, the following record of expense and proceeds will show the value of this crop. It will be noticed that the plants were set late, and this will account for the large percentage of soft heads secured. When it is remembered that the plants were set late, on unmanured land, the crop must certainly be regarded as a profitable one. Sufficient small plants were sold to pay for the seed, hence that item does not appear in the list:

## EXPENSE.

Plowing $1\frac{1}{4}$ acres,	\$3 67
Harrowing and marking,	2 00
Planting, 20 hours, $12\frac{1}{2}$ c,	2 50
Cultivating three times, 10 hours,	2 00
Hoeing three times, 30 hours, $12\frac{1}{2}$ c,	3 75
Harvesting and storing,	4 00
Total,	\$17 92

## RECEIPTS.

Sold 875 hard heads @ 5c,	\$43 75
" 110 soft heads @ $2\frac{1}{2}$ c,	2 70
Stored 400 hard heads, worth 6c	24 00
" 1000 soft heads worth 2c,	20 00
Total,	\$90 45

Net receipts, \$72 53

This result, while not large when compared with what has been accomplished in moister climates on heavily manured land, is well worth notice as demonstrating the usefulness of small "side crops."