

**OKLAHOMA**  
**Agricultural Experiment Station.**

**STILLWATER, OKLA.**

**BULLETIN NO. 9.—JANUARY, 1894.**



**Department of Horticulture.**

**TEST OF VARIETIES OF VEGETABLES—1893.**

**FRANK A. WAUGH.**

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## GARDEN VEGETABLES.

### Comparative Test of Varieties—1893.

F. A. WAUGH, HORTICULTURIST.

**NATURE OF EXPERIMENTS REPORTED.**—The experiments reported in this Bulletin are all comparisons of varieties of vegetables. If this is kept in mind, the reader may be saved some time which he might waste in looking for testimony on other questions.

**SOIL.**—The soil in which these experiments were conducted is second bottom near Stillwater creek. The top soil is thin, and decidedly inferior to the average of that in the vicinity. It is "two years from the sod," but has been thoroughly cultivated and was in very good mechanical condition when the seeds were planted. None of that included in these experiments had ever been manured.

**PLANTING.**—The seeds were planted at times indicated under the several heads. All were sown in rows, either drilled or in hills, between the rows of young apple trees in the orchard. Planting was done either by hand or with the seed drill.

**SEED** was bought of several seedsmen, but mostly from Trumbull, Streat & Allen, Kansas City, Mo.; F. Barteldes & Co., Lawrence, Kansas; J. C. Vaughan, Chicago, Ills.; and D. M. Ferry, Detroit, Mich. Names of those furnishing seeds are omitted from the following notes, except in cases where they may have some special significance.

CULTIVATION.—Ordinary clean cultivation with hoe and five-tooth cultivator was given. All plats were kept quite free from weeds.

NOTES reported in this Bulletin are exactly correct. Many persons who are not familiar with scientific work fail to appreciate the difference between accuracy of this sort and simple estimation of facts. While, from the nature of the subject, even absolutely exact records cannot settle these questions, they have nevertheless a value not belonging to figures into which the slightest degree of guess work has entered. It is to be understood, then, that when these notes make distinctions by tenths of an inch or by parts of a pound, they are true for the cases reported. It will be noted that many notes are given in metric terms, though the reduction to the common system always accompanies them. Wherever it is practicable the metric system is used in the work of the Department of Horticulture, it being very much easier to use in all computations. Further than this, the officers of the Experiment Station feel that whatever they may be able to do in hastening the day of the general adoption of the metric system by familiarizing people with it, they are justified in doing.

RESULTS are not to be interpreted too literally. The figures given are the record of a single year's experiments in one place. The varieties which excel this year may prove nearly worthless next. Nevertheless there is a considerable weight to results thus carefully secured; and the eminent success of any variety this year gives a strong prejudice in favor of the same strain next season. It is just this: that one must use some judgment in his interpretation of notes like these.

DESCRIPTIONS of varieties given in the following pages are very studiously prepared to give exact records of the varieties as growing in the experiments. Many of the distinctions made might be expected to apply to the same varieties elsewhere and at other times. Other and more variable characters are given exact notes here simply as measurements of development under existing conditions. These descriptions, like the other notes, must be interpreted with judgment; but it is hoped that, divested of the gaudy colors of the seed catalogue, they will be useful in giving more unbiased information as to the real characters and habits of vegetable varieties.

RECOMMENDATIONS are seldom made with the follow-

ing notes; but the common question of what varieties to plant is noticed under a special caption at the end of the Bulletin.

TERMS.—It is found quite incompatible with even ordinary accuracy to eliminate altogether the unequivocal terms of scientific language. At the suggestion of the Director, Dr. J. C. Neal, an explanation of terms not used in every day conversation is appended.

### Experiment 14.—PEAS.

Of peas seven varieties were planted April 11th. They were drilled in rows four and one-half feet apart, and kept clean by careful cultivation. The crop was moderately successful; but though several pickings were made, it is impossible to give comparisons of product which would indicate the facts. They are therefore omitted, and the following accurate descriptions of the varieties as here grown are submitted:

NO. 2. CARTER'S FIRST CROP.—A mixed lot. Type specimens are 20–25 cm. (7.9–9.8 in.) high and medium slender; leaflets two to four, medium green, small, broad, ovate, obtuse, almost entire or with an occasional broad and shallow denticulation, stipules small, explanate, evenly dentate toward base, medium acute above, tendrils small and weak; pods borne at sixth or seventh node, 7.5 cm. (3 in.) long, cylindrical; peas five to seven, spherical.

Mixed with this was a taller variety, making about one-third of the entire lot.

NO. 3. FIRST AND BEST.—A much mixed lot, varying from 13 to 15 cm. (5.1–5.9 in.) high. Prevailing type is short and early; stems slender and hard; leaflets two to four, medium green, small, oval, obtuse entire; stipules small, irregular and irregularly dentate, usually acutish; tendrils small and weak; pods irregular and not well filled, 4–5 cm. (1.6–2 in.) long; peas spherical, of good size and medium quality.

NO. 4. STANLEY.—This lot was somewhat mixed, but the prevailing type was quite uniform in characters; 25–30 cm. (9.8–11.8 in.) high, medium slender and stems hard; leaflets two to four, medium green, cuneate-ovate or ovate, narrower than in First and Best, entire, tapering at base and apex; stipules large, explanate or irregular, dentate below with an occasional single deep dentation above;

tendrils small; pods borne singly at seventh and eighth node, regular, straight or slightly recurved, cylindrical, well filled; peas crowded and a little flattened, dry, medium quality.

NO. 6. TOM THUMB.—Made a good, even stand. Plants 6–14 cm. (2.4–5.5 in.) high, strong and stocky, internodes short; leaflets two to four, dark green, large, rather thick, broad oval, sparingly denticulate, obtuse; stipules comparatively small, short and broadly oval, usually somewhat revolute, barely more denticulate than leaflets; tendrils short and strong; pods borne singly at eighth to tenth node, 4–6 cm. (1.5–2.4 in.) long, straight, cylindrical and well filled; peas four to five, medium size, spherical.

NO. 7. CHAMPION OF ENGLAND.—Plants vigorous, 75 cm. (30 in.) high, branching a very little; leaflets four to six, usually small, oval, tapering at each end, thin, entire; stipules larger, explanate or slightly convolute, rather narrow, sparsely and coarsely dentate below; tendrils large and vigorous; pods borne singly at twelfth to sixteenth node, large, cylindrical or flattened, straight or recurved, 7–8 cm. (2.75–3.1 in.) long by 1.2–2 cm. (.5–.8 in.) broad; peas five to seven, irregular, medium size, quality superfine.

### Experiment 15.—BEANS.

Twenty-seven varieties of beans were planted April 11th and 12th. They were drilled in rows four and one-half feet apart, these rows running between the rows of apple trees in the young orchard. Ordinary clean cultivation was given.

The entire experiment was unsatisfactory because of the imperfect development of all the plants. No comparison of product could be made. However, those varieties which made growth enough to warrant descriptive notes were described as recorded below.

No insect pest affected the crop seriously. A fungus disease of the pods, said to be mycologically identical with one attacking watermelons, affected a few varieties to a considerable extent—notably the China Red Eye and Refugee.

NO. 1. BLACK EYED WAX. — Plant short, stout, branching; leaflets medium size, broad oval, a little rough; perfect pods straight, cylindrical, 10 cm. x 1.3

cm., (3.9 in. x .5 in.), at first green, soon changing to creamy white, moderately brittle and tender; bean large, 11 x 5 mm., (.4 x .2 in.), oval or slightly reniform, smooth, clear white with bright black eye.

NO. 2. DETROIT WAX.—Plant not distinguishable from No. 1; pods straight, flattened sidewise, 10 x 1.5 x 1 cm. (3.9 x .6 x .4 in.), at first green, soon changing to creamy white or yellowish; beans about six, dull white, with irregular brown eye, extending over the ventro-posterior surface, reniform, narrower backward, 13 x 9 mm., (.5 x .35 in.)

NO. 3. GERMAN DWARF BLACK WAX.—Plant not distinguishable from No. 1; blossoms pink; pods straight or recurved, somewhat flattened sidewise, 11 x 1.5 x 1 cm., (4.3 x .6 x .4 in.), creamy white; beans five or six, bluish black, semi-cylindric or a little flattened, anterior end oblique-truncate with greatest surface of the rounded posterior end parallel to the truncation.

NO. 4. GOLDEN EYED WAX.—Plant very much like No. 1 or a trifle larger, 25 cm. (9.8 in.) high; leaflets more attenuate upwards; pods straight or a very little recurved, slightly flattened, 11 x 1.5 cm., (4.3 x .6 in.), creamy white; beans five, rather small, white with irregular orange or brown eye extending backward to end of bean and bordered by several small spots of the same color extending over posterior end, oval very slightly oblique-truncate, 9 x 14 mm., (3.8 x 9-16 in.)

NO. 5. GOLDEN WAX.—Plant low, 18 cm. (7.1 in.) high, dark green, a little rough; leaflets medium or small, broad oval; blossoms white; pods straight or a little recurved, nearly cylindric, 9 cm. (3.5 in.) long, green, becoming yellowish; beans four or sometimes five, oval, white blotched with dull purple upon which is a second mottling of a deeper shade of purple; the coloring completely surrounds the hilum and is confined chiefly to the ventral surface; bean 9x14 mm., (3-8x9-16 in.)

NO. 6. DWARF HORTICULTURAL.—Plant 15 cm. (5.9 in.) high, strong and stocky; leaflets medium size, round oval, rather rough; pods nearly straight or irregularly recurved, somewhat flattened, slightly creased at the back, 11x1.7x1.2 cm. (4.3x.7x.5 in.), green, becoming greenish yellow blotched with light pink where exposed to sunlight; beans five, large, 1.7 cm. (11-16 in.) long, irregular rounded oval, white with pink markings equally distributed and tending to run in longitudinal bands.

NO. 7. CHINA RED EYE.—Plant 16 cm. (6.3 in.) high, strong and stocky; leaflets medium size, a little rough, rather dark green, round oval; blossoms white; pods irregularly curved, a trifle flattened, 10 cm. (3.9 in.) long, bright green, ripening through dull yellow to brown; beans four, cylindric-reniform, rounded at both ends, white with small area of pink blotching about the hilum extending over ventro-posterior surface, size 16x10 mm. (5-8x3-8 in.)

NO. 8. EARLY CHINA RED EYE.—Differing from No. 7 as follows: Plants more vigorous, 21 cm. (8.3 in.) high; pods often containing five beans; beans averaging 14x9 mm. (9-16x3-8 in.)

NO. 9. NAVY, OR EARLY MARROW PEA.—Plants have a tendency to climb, 60 cm. (23.6 in.) in extreme length, stocky and vigorous below; leaflets medium size, round oval; blossoms white; pods nearly straight and cylindric, 7.5x.9 cm. (3x.4 in.) or wider, bright green, becoming yellow late in ripening; beans five, white, slightly oval or a little truncate at one end, hilum hardly depressed, 10x5 mm. (3-8x3-16 in.)

NO. 10. WHITE PROLIFIC TREE.—Plant a half-climber, 70 cm. (27.6 in.) high, flowering freely throughout its length; stem rather slender; leaflets small, medium round oval, a trifle rough; blossoms white; pods irregular, usually a little recurved, sub-cylindric, often somewhat inflated, 7.5 cm. (3 in.) long, light green, changing to greenish gray, marked more or less conspicuously in fine, irregular lines arising from the back and running obliquely forward; beans about six, not different from those of No. 9.

NO. 11. EARLY MOHAWK.—Plant 26 cm. (10.2 in.) high, dark green; leaflets large, a little wrinkled, broad oval; flowers white; pods green, usually recurved, a trifle flattened, medium smooth, usually with long acuminate tip, 9 cm. (3.5 in.) long; beans four or five, cylindric-reniform, chocolate brown, mottled with another shade of brown barely darker and having a few small specks of gray, 15x7 mm. (5-8x5-16 in.)

NO. 12. GODDARD OR BOSTON FAVORITE.—Plant inclined to run, 55 cm. (21.7 in.) high without stakes, slim; leaflets rather small, medium green, round oval; flowers pale pink; pods light green mottled with red, straight or recurved, conspicuously flattened, 11x1.6x1.1 cm. (4.3x.6-x.4 in.); beans four or five.



No. 13. REFUGEE, OR 1000 TO 1.—Plants 22 cm. (8.7 in.) high; not very strong; leaflets rather small and smooth; blossoms white; pods green, 6 cm. (2.4 in.) long, recurved, cylindric, usually acuminate tipped; beans four.

A very poor lot.

No. 16. SOUTHERN PROLIFIC.—Proved to be a small, white bean of the Mexican Tree type, nothing like the true Southern Prolific. Even this was mixed with another sort.

No. 27. HENDERSON'S BUSH LIMA.—A fine bush bean, growing here 25 to 30 cm. (9.8 to 11.8 in.) high; having leaves of the characteristic lima form; beans three or four, small, flattened, kidney shaped.

Bears for several weeks, usually till frost; very prolific. By far the best variety for general planting.

## Experiment 20.—MUSK MELONS.

On the 12th of April a list of musk melons was planted; but unfavorable weather made the stand so irregular and the plants so inferior generally that it was thought best to plow them all up and replant. This was done, the new planting being made on the 22nd of May. All the seeds for this second planting were furnished by J. C. Vaughan, seedsman, Chicago. There were thirty varieties planted.

The musk melons were planted between the rows of young apple trees in the apple orchard as explained elsewhere for all the experiments herewith reported. Rows were nine feet apart, and hills approximately four feet apart in the row. Each variety was given 150 feet of row.

With regard to the descriptions given, it is to be noted that the intention was to describe accurately one typical specimen, though in varieties which showed great variability, inconstant characters were usually dropped from the descriptions, or specially noted. The measurements of fruits are taken from single representative specimens rather than computed as averages of several measurements. It is to be specially noticed that of the two measurements given conjointly, the first always represents the diameter of the melon from stem to calyx, and the second the perpendicular diameter. In case the first measurement is less than the second, it simply means that the specimen was broader than long, applying these terms to the dimensions usually understood by them.

The comparison of musk melons was one of the most

satisfactory conducted on the grounds during 1893. The crop was a fairly good one for the circumstances; and the conditions and the growth of the crop were normal. While these results are in no sense final, and must not be taken for more than they are worth, still they are as reliable as most of their kind; and are sufficiently indicative of facts to be valuable.

No. 1 BALTIMORE.—Vines large, coarse, vigorous; fruit 30 x 15 cm. (11.8 x 5.9 in.) somewhat tapering toward both ends, usually more abruptly toward the calyx end; sutures medium deep; ripening rather light greenish yellow; netting prominent; flesh nearly white, firm, having but little taste; seeds many, large.

No. 2. BANANA.—Vines small, slender; leaves small; round, smooth, decidedly light colored; petioles long and slim; fruit 41 x 14 cm. (16.1 x 5.5 in.) long, slim, tapering toward the stem; sutures hardly visible; skin smooth, light yellow, flesh thin, firm, orange, having but little taste; seeds not many.

No. 3 BANQUET.—Vines large and coarse; leaves large, coarse, dark green, sinuate or a little lobed; fruit 14 x 14 cm. (5.5 x 5.5 in.) spherical; sutures obsolete or nearly so; skin between reticulations very smooth, appearing chartaceous; reticulations large, coarse, irregular; often having very large navel at calyx end; a very peticular melon in appearance; flesh beautiful orange, thick, a little tough, medium sweet or less; seeds many, large. (See illustration).

No. 4. BAY VIEW.—Vines medium; leaves very uneven, ranging from very small to large; fruit of much the same form and size as Baltimore, No. 1, but sutures deeper and reticulations more prominent; flesh gray or light green, very coarse grained, watery, of second quality.

No. 5. BIRD CANTALOUPE. Vines rather small, uneven; leaves of all sizes, medium green; fruit 24x20 cm. (9.4x7.9 in.), oval; sutures irregular, medium deep; surface light yellow, rather smooth; the few reticulations mostly scattered and running longitudinally; flesh thin, white, fine grained, of poor quality.

No. 6. IMPROVED CANTALOUPE.—Vines medium strong; leaves varying, often very large, long with rounded point; many old leaves are mottled with light yellow; fruit 24x19 cm. (9.4x7.5 in.) and larger, tapering toward both ends; sutures deep; reticulations obscure or wanting; surface light yellow; flesh thick, golden yellow, fine grain-

ed, firm, moderately sweet and of better quality than most large sized melons; seeds numerous, large.

No. 7. CASSABA.—Vines large, coarse; dark green; fruit 20x16 cm. (7.9x6.3 in.), strongly ellipsoid; sutures medium; reticulations moderately prominent and regular; surface yellow, flesh medium thickness, white, medium grain, rather soft, not very sweet, but of medium quality; seeds many, medium size.

No. 8. CHAMPION MARKET.—Vines medium strong; leaves medium size and color, rounded; fruit not described.

No. 9. CHICAGO MARKET, SELECT.—Vines medium large; leaves small to medium, rounded and sinuate; fruit not described.

No. 10. CHICAGO MARKET, GIANT.—A poor stand. Vines slender, free growing; leaves small to very small, medium green, conspicuously sinuate or lobed; petioles short; fruit 17x21 cm. (7x8.3 in.), spherical; sutures deep; reticulations thick, not prominent; surface grayish yellow; flesh white, rather thick, coarse grained and a little stringy, almost tasteless; seeds numerous and large.

No. 11. IMPROVED CHRISTIANA.—Vines medium strong; leaves medium large, even, medium green, rounded; petioles strong; fruit 18x18 cm. (7.1x7.1 in.), irregular in form; sutures deep; reticulations obsolete or represented by faintly darkened marks on an orange ground; flesh light orange, rather tough, firm, medium sweet, of medium quality, having a peculiar flavor impossible of description.

No. 12. DELMONICO.—Vines strong; medium free growing; leaves very large, dark green, often pointed, conspicuously sinuate or lobed; fruit 20x15 cm. (7.9x5.9 in.), oval, tapering at both ends; sutures rather shallow; light orange yellow with prominent green along sutures; netting coarse, reticulated; flesh light yellow, thick, almost tasteless; texture firm and fine grained; seeds numerous, medium.

No. 13. EMERALD GEM.—Vines small and weak; leaves small to very small, uneven and irregular; petioles short and weak; fruit 11x12.5 cm (4.3x4.9 in.), subglobose; sutures very deep; reticulations not prominent, in many places represented only by darker marks on the deep yellow background; flesh thick, orange, coarse grained, stringy, rather sweet, of good quality.

Fruits have such a tendency to crack from the calyx

end that but very few perfect specimens are found. This is a serious defect.

No. 14. HACKENSACK.—Vines medium free growing; leaves medium to small, uneven, usually sinuate; fruit 17x17 cm. (6.7x6.7 in.), globose; sutures deep; reticulations coarse and medium prominent; body color dark yellow; flesh straw colored, coarse, stringy, watery, of poor quality; seeds large.

No. 15. EXTRA EARLY HACKENSACK.—A poor stand. Vines long-growing but scantily branching; leaves medium to large, irregular, entire or lobed; fruit 17x18 cm. (6.7x7.1 in.), subglobose; sutures rather shallow; reticulations few, but the reticulation marks continued over most of the surface in a shade of green lighter than the grayish yellow body; flesh very thick, very firm, rather coarse grained, of excellent quality; seeds numerous, medium small.

No. 16. IRONDEQUOIT.—Vines coarse and long, not much branching; leaves medium large, very coarse, rough, dark green, lobed; petioles medium strong; fruit 16x18 cm. (6.3x7.1 in.), globose; sutures medium deep; reticulations not prominent, irregular; color light yellow; flesh orange yellow, thick, fine grained and very firm, good quality; seeds numerous, medium large.

No. 17. JENNY LIND.—Vines rather slender, not much branching leaves small to medium, medium green, entire or sinuate; petioles medium length, usually slender; fruit 10.5x11.5 cm. (4.1x4.5 in.) and larger, spherical; sutures medium shallow; surface greenish yellow; reticulations indistinct and irregular; flesh gray or greenish, medium thick, a little coarse, very delicate and sweet.

The best table melon in the experiment.

No. 18. MILLER'S CREAM.—Vines medium strength, not much branching; leaves medium size, rather dark green, sinuate or lobed; petioles irregular; fruit 11x10 cm. (4.3x3.9 in.), ovoid; sutures rather deep; reticulations very prominent and rough; color greenish yellow; flesh medium thick, rather coarse grained, sweet, of excellent quality.

No. 19. MONTREAL MARKET NUTMEG.—Vines coarse, long, strong, not much branching, leaves medium to very large, dark green, very rough, lobed; petioles coarse and strong; fruit 28x23 cm. (11x9.1 in.), oval; sutures very deep; reticulations not prominent, disconnect-

ed, mostly longitudinal; color light creamy yellow; flesh very thick, white, rather soft, watery, medium fine grained, quality fair; seeds rather few, large.

No. 20. EARLY NETTED GEM.—Vines medium strength, medium length; leaves small to medium, round, entire or sinuate; petioles extra long; fruit 13x11 cm. (5.1x4.3 in.), ovoid; sutures rather shallow; reticulations medium coarse; color light greenish yellow; flesh light green, firm and grainy, not very sweet, second quality; seeds rather small.

No. 21 EARLY NUTMEG.—Vines medium strength, rather long; leaves small to medium, sinuate; petioles short to medium length, rather weak; fruit 13x13 cm. (5.1x5.1 in.), subglobose; sutures shallow; reticulations regular but inconspicuous; surface light grayish yellow; flesh thick and tender, fine grained, moderately sweet and of good quality; seeds large.

No. 22. EXTRA EARLY NUTMEG.—Vines very slender, short; leaves very small, entire to lobed; petioles small and weak; fruit 13x19 cm. (5.1x6.3 in.), subglobose; sutures medium deep; surface green with only a tinge of yellow; reticulations few, small with coarse nets, the green unreticulated surface bearing the reticulation marks in a lighter shade of green; flesh rather thin, white or light yellow, watery, coarse grained and stringy, sweet.

No. 23. THE OSAGE.—Vines rather coarse, not freely branching; leaves small to large, rather dark green, a little rough, entire or sinuate; petioles strong and irregular; fruit 15x15 cm. (5.9x5.9 in.), globose; sutures rather shallow; surface nearly smooth with elevated reticulations only in irregular patches, very dark green with an occasional tinge of yellow; flesh deep orange, firm and fine grained, sweet but not pleasantly flavored.

No. 24. PERFECTION.—Vines medium strength, long; leaves medium size, rather dark green, entire or slightly sinuate; petioles variable; fruit 22x23 cm. (8.7x9.1 in.), irregular globose; sutures deep; reticulations prominent and close set; color green; flesh very thick, orange, firm, fine grained, medium sweet, of excellent quality; seeds small. (See Illustrations.)

The best large melon in the experiment.

No. 25. THE PRINCESS.—Vines strong and large, very luxuriant; leaves medium size, rather dark green, usually entire or nearly so; petioles strong, medium long;

fruit 13x14 cm. (5.1x5.5 in.), subglobose; sutures rather dark; surface yellowish green, conspicuously reticulated; flesh thin, deep orange, very coarse grained, watery, of medium good quality; seeds rather numerous and large.

No. 26. SUPERIOR.—Vines irregular but generally weak, moderate length; leaves small, not luxuriant; petioles short and weak; fruit 13.5x15 cm. (5.3x5.9 in.), subglobose; sutures nearly obsolete; reticulations prominent to wanting; much inclined to shallow cracking along reticulation lines; flesh light green, solid, moderately sweet, of good quality.

No. 27. SURPRISE.—Vines strong, long; leaves large, rather dark green, usually sinuate, rather rough; petioles long and very strong; fruit 20x20 cm. (7.9x7.9 in.), spherical; sutures medium; reticulations obsolete or inconspicuous and irregular; surface gray; flesh not very thick, golden yellow, very firm and fine grained, of medium quality; seeds not very numerous, of medium size.

No. 28. VICK'S EXTRA EARLY PROLIFIC.—Vines large, free growing; leaves medium size, rather dark green, usually round and entire; fruit 21x16 cm. (8.3x6.3 in.), regular elliptical; sutures rather shallow; reticulations faint but regular; color light creamy yellow; flesh thick, orange, of excellent texture and good quality; seeds medium.

A good medium sized variety.

No. 29. WHITE JAPAN.—Vines slender, rather weak growing; leaves small to medium, entire or slightly sinuate; petioles short; fruit 11x13 cm. (4.3x5.1 in.), subglobose; sutures medium deep; reticulations faint and irregular; color light yellow; flesh very thin, orange, coarse grained and sweet.

No. 30. WARD'S NECTAR.—Vines slender, but very free growing; leaves small to medium, rather dark green, entire to sinuate; fruit 19x16 cm. (7.5x6.3 in.), oval; sutures deep; reticulations prominent and close; flesh light green, rather coarse and grainy, very sweet, of medium quality; seeds rather small.

Number.	VARIETIES.	Days to Germination.	Days to Bloom.	Days to First Picking.	Average weight.		Total Crop in Pounds.
					Number.	Pounds.	
1	Baltimore.....	12	37	86	29	4.5	429.4
2	Banana.....	12	37	82	5	3.2	380.8
3	Banquet.....	12	37	84	38	2.2	396.4
4	Bay View.....	12	33	84	7	5.6	528.4
5	Cantaloupe, Bird.....	12	37	96	4	4.4	311.7
6	Cantaloupe, Improved...	12	33	82	17	4.9	361.7
7	Cassaba.....	12	33	91	1	4.4	356.6
8	Champion Market.....	12	39	98	3	2.7	213.9
9	Chicago Market, Select..	12	39	85	3	3.7	356.8
10	Chicago Market, Giant...	12	39	89	4	1.7	140.3
11	Christiana, Improved....	12	37	89	3	4.9	363.4
12	Delmonico.....	12	39	84	12	4.4	403.6
13	Emerald Gem.....	12	39	84	4	2.7	126.6
14	Hackensack.....	15	39	96	1	4.8	297.2
15	Hackensack, Extra Early	15	39	89	6	4.5	343.0
16	Irondequoit.....	12	37	92	8	5.5	297.7
17	Jenny Lind.....	12	37	84	41	1.6	288.8
18	Miller's Cream.....	12	37	96	5	2.3	158.2
19	Montreal Market Nutmeg	12	37	88	6	6.8	338.8
20	Early Netted Gem.....	12	37	84	35	1.7	445.4
21	Nutmeg, Early.....	12	37	84	25	2.1	277.2
22	Nutmeg, Extra Early....	12	37	84	5	2.9	288.0
23	The Osage.....	12	46	96	4	4.4	281.0
24	Perfection.....	12	39	81	6	6.8	488.4
25	The Princess.....	12	39	86	4	3.5	419.7
26	Superior.....	12	39	96	2	3.9	309.7
27	Surprise.....	12	39	84	4	4.7	530.1
28	Vick's Ex. Ey. Prolific...	12	39	89	3	2.6	414.2
29	White Japan.....	12	39	86	2	4.3	260.8
30	Ward's Nectar.....	12	37	96	7	2.8	322.9

No. 1.—“Days to germination” gives record of the time from planting till the entire row was visible above ground.

No. 2.—The note of “Number” under “Average weight” gives the number of melons included in the average.

The following points may be observed from the table:

1st.—The largest crop in weight of fruit came from Surprise, No. 27.

2nd.—In general the largest crops came from those varieties coming first into bearing.

3rd.—The largest melons according to the averages shown were taken from Montreal Market Nutmeg, No. 19, and Perfection, No. 24. The smallest melons were taken from Jenny Lind, No. 17—the variety generally conceded to be the best in the experiment. Lest, however, any impression should be given that size is necessarily gained at the expense of quality, it must be stated that Perfection, one of the largest, ranked among the very first in quality also.

### Experiment 21—WATER MELONS.

On the 12th and 13th of April a select list of water melons was planted; but the unfavorable weather made the germination so irregular that it was thought advisable to plow up the whole experiment and replant. This was done May 22nd.

At this time there were planted thirty-six varieties. The seed was all bought from J. C. Vaughan, Chicago, Ills. They were planted in rows between the rows of trees in the young apple orchard. The melon rows were nine feet apart, and the hills four feet apart in the row. Ordinary clean culture with hoe and horse cultivator was given.

Soon after the first of August the vines were severely attacked by plant lice, *Aphis cucumeris*, Forbes, as identified by Mr. C. L. Marlatt, Entomological Division, United States Department of Agriculture. The damage was not so great as with cucumbers, but was sufficient to interfere materially with the growth of the vines.

At about the same time a very destructive rot of the fruit was noted in considerable quantity. This rot attacks the young fruits, spreading usually from the blossom end, but sometimes from the side. The affected spot becomes darker in color and finally black and shrivelled. Often the whole fruit is destroyed; and it very rarely matures. Very often, also, the young melons are found, immediately after fertilization, blackened and blasted, apparently destroyed by the same agency as affects the larger fruits. Sometimes a part of the blackened surface of a melon shows a somewhat granular appearance and a darker color, due to the fruiting spores of one of the fungi associated with the rot. Different varieties of melons were affected



in greatly different degrees by the disease. On the 15th of August a count was made. The following percentages were found affected and are here recorded as representative cases indicating the extent of the damage:

Plat No. 9, NEW DELAWARE, 25 per cent.

Plat No. 12, FLORIDA'S FAVORITE, 30 per cent.

Plat No. 13, GIRARDEAU'S NEW FAVORITE, 44 per cent.

Plat No. 15, GRAY MONARCH, 62 per cent.

Plat No. 21, JONES' JUMBO, 8 per cent.

Plat No. 31, SCULPTURED SEEDED JAPAN, 1 per cent.

Mr. M. A. Carleton, Assistant Botanist of the Kansas Experiment Station, to whom specimens of the disease were sent, has identified four species of fungi, and is confident of two others unidentified, associated with the rot. The direct responsibility of any one or more of these for the damage has not yet been shown, though it seems circumstantially probable that the cause of the disease is to be found among these parasites. Field experiments for the control of the disease by spraying with fungicides were undertaken; but it was so late in the season before operations could be begun that no satisfactory results were secured. Careful attention to this problem is proposed for the season of 1894.

Though the soil on which the experiment was conducted is not well adapted for water melons, the rot is chiefly responsible for the unsatisfactory fruitage and the consequent incompleteness of the notes. Any comparison of the amount of product is valueless; but descriptions of most of the varieties were made. These are faithful descriptions of the varieties as they developed; and most of the notes, from the nature of the case, would supposedly be as accurately descriptive of the same varieties in better circumstances.

NO. 1. APPLE PIE.—A poor stand. Vines strong, long; leaves strong, medium size; fruit large, cylindrical; of the so-called "pie melon" character.

NO. 2. BLACK SPANISH.—Not a good stand. Vines slender and weak; no good specimens of fruit secured; almost solidly dark green in color with very obscure darker markings; flesh pink; seeds black.

NO. 3. BOSS.—Rather poor stand. Vines slender, weak; leaves small; fruit not described.

NO. 4. CHINESE.—Did not germinate at all.

NO. 5. CITRON, RED SEEDED.—Vines vigorous and long; leaves rather small and short; fruit not described.

No. 6. COLORADO CITRON.—Vines remarkably long and luxuriant; leaves medium small and short; fruit nearly globular, marked in irregular bands of green and gray. A very prolific lot.

No. 7. CUBAN QUEEN.—Vines strong, but short; leaves rather large and long; fruit light green or gray with narrow and irregular bands of dark green; flesh pink; seeds black marked with brown.

No. 8. DARK ICING.—Vines very small and weak, apparently partly due to the location of the row in a dead furrow; leaves small; fruit medium green with coarse reticulations; flesh pink; seeds white.

No. 9. NEW DELAWARE.—Vines rather strong, but irregular in growth; leaves large; fruit medium green with darker bands and fine reticulations; flesh pink; seeds white.

No. 10. THE DIXIE.—Vines slender but free growing; leaves slender and medium large; fruit 23x21 cm. (9.1x 8.3 in.), subglobose, dark green with irregular stripes of lighter green; flesh bright pink, good grain and moderately sweet; seeds black, rather large. Other specimens are light green with narrow and conspicuous bands of dark green.

No. 11. FERRY'S PEERLESS, or ICE CREAM.—Vines slender, rather small; leaves small; fruit 25x21 cm. (9.8x 8.3 in.), elliptical, light green with markings of a much darker shade running in irregular longitudinal bands; flesh pink, good grain and flavor; seeds gray, darker at the points.

No. 12. FLORIDA'S FAVORITE.—Vines slender, medium free growing; leaves medium to medium large; fruit 25x15 cm, (9.8x5.9 in.), subcylindric, light green with dark longitudinal bands between which are fine reticulate markings of dark green; flesh light pink, very tough, in point of flavor absolutely worthless; rind very thin; seeds small, white with darker points.

No. 13. GIRARDEAU'S NEW FAVORITE.—Vines medium strong, free growing; leaves medium; fruit medium or light green with irregular darker bands and conspicuous reticulate markings; flesh pink, coarse grained and sweet; seeds white with darker points.

No. 14. GOODWIN'S EXTRA EARLY.—A poor stand. Vines rather slender; leaves small and slender; fruit light gray with indistinct reticulations; flesh pink; seeds very

small, dark red.

No. 15. GRAY MONARCH, or LONG WHITE ICING.—Vines rather slender and not very vigorous; leaves small, irregular; fruit gray with darker green reticulations; flesh, pink; seeds white, darker at tips.

No. 16. GREEN and GOLD.—Vines slender, medium long; leaves medium; fruit 22x18 cm. (8.7x7.1 in.), sub-cylindric, dark green faintly mottled with lighter shade; flesh bright, golden yellow, a little tough and stringy, medium quality; seeds gray with black edges and points.

No. 17. HOOSIER KING.—Vines rather slender, medium long; leaves medium; fruit not described.

No. 18. HUNGARIAN HONEY.—Vines slender, rather long; leaves medium to large, very slender and finely divided; fruit 20x20 cm. (7.9x7.9 in.), globose, dark green faintly marked with reticulate lines of darker shade, these aggregating so as to form irregular longitudinal markings; flesh light pink, coarse, poor quality; seeds very small, red.

No. 19. IRON CLAD.—Vines rather strong, long; leaves large, coarse; fruit 33x18 cm. (13x7.1 in.) sub-cylindric, light green with narrow, dark stripes; flesh light pink, solid, of medium quality; seeds large, gray with darker edges and points.

No. 20. JOHNSON'S CHRISTMAS.—Vines slender but free growing; leaves small; fruit 18x17 cm. (7.1x6.7 in.), subglobose, very dark, solid colored marked with fine reticulate lines; flesh pink, tender and of good quality; seeds light red, rather large.

No. 21. JONES' JUMBO. (Original seed.) Vines medium strength, long; leaves small to medium large; fruit 19x23 cm. (7.5x9.1 in.), spherical, dark green faintly mottled with lighter green; flesh bright red, fine grained and very sweet; seeds many, large, white with black tips. One of the best specimens measured 26x22 cm. (10.2x8.7 in.).

No. 22. KENTUCKY WONDER.—Vines medium strength, long, vigorous; leaves small and slender; fruit 26.5x18 cm. (10.4x7.1 in.), ovoid, medium dark green marked with irregular reticulate lines of much darker shade; flesh pink, moderately good grain and flavor; seeds numerous, large, dark red.

No. 23. **KOLB'S GEM.**—Vines slender; leaves small to medium; fruit about equally divided into bands of dark and medium light green upon which are coarse reticulations; flesh pink, of good grain and flavor; seeds black marked with brown.

No. 24. **MOUNTAIN SPROUT.**—Vines slender or stronger; leaves medium; fruit with about equal bands of medium green and gray, reticulate over all; flesh pink; seeds brown.

No. 25. **MOUNTAIN SWEET.**—Vines slender, long; leaves small; fruit dark, solid green with darker reticulations; flesh pink; seeds large, black with brown markings.

No. 26. **PHINNEY'S IMPROVED.**—Vines small and weak, owing perhaps to poor location; leaves small, dark colored; fruit not described.

No. 27. **PRIDE OF GEORGIA.**—Vines rather strong, long; leaves small but coarse; fruit 23x19 cm. (9.1x7.5 in.) medium green mottled with green just a shade lighter; flesh bright pink, good texture, poor flavor; seeds medium size; white edged with black.

No. 28. **RATTLESNAKE.**—Vines strong, long, vigorous; leaves medium to large, coarse; fruit gray with irregular dark bands and reticulations; flesh red, good grain; seeds dark gray with black edges and points.

No. 29. **RUBY GOLD.**—Vines strong, rather free growing; leaves medium size, rather dark colored; fruit dark green conspicuously reticulate; flesh bright yellow; seeds gray with brown edges and points.

No. 30. **SCALY BARK.**—A poor stand. Vines strong, medium long; leaves medium large, coarse and dark colored; fruit 26x19 cm. (10.2x7.5 in.), medium dark green, with dim longitudinal lines; flesh white or slightly yellow, firm and grainy, poor quality; seeds rather few, small, black, the integument peculiarly cracked showing white markings.

No. 31. **SCULPTURED SEEDED JAPAN.**—Vines rather slender, long; leaves small, dark, bluish green; fruit with bands of two shades of green about equal in width upon which are fine markings of a darker shade, being rather spots than reticulations; flesh light yellow, solid, second quality; seeds black with many cracks in integument making white markings.

No. 32. SEMINOLE.—Vines medium strength; leaves rather large and coarse; fruit light gray with indistinct spots and reticulations; flesh pink, good grain and quality; seeds large and brown.

No. 33. VAUCLUSE RED FLESH.—Vines slender and long; leaves small, very finely divided; fruit 22x15 cm. (8.7x5.9 in.), medium light green mottled with a darker shade; flesh crimson red, coarse grained, quite sweet; seeds many, large, red.

No. 34. VICK'S EXTRA EARLY.—Vines slender, long; leaves medium size, rather finely divided; fruit not described.

No. 35. VOLGA.—A very poor stand, apparently owing to location. Vines poor; fruit gray with indistinct and narrow longitudinal bands; flesh pink; seeds small, black.

No. 36. WHITE GEM.—Vines medium strong; long; leaves small to medium, rather finely divided; fruit 17x16 cm. (6.7x6.3 in.), globose, very light colored, nearly solid gray with indistinct darker stripe; flesh bright red, good grain and flavor; rind very thin; seeds very small, thick, rounded, black.

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## Experiment 22.—CUCUMBERS.

Twenty-nine varieties of cucumbers were planted May 20th, in the same manner and under the same circumstances as recited for musk melons and water melons.

During the season the crop was interfered with by numerous insects. The cucumber beetles (*Diabrotica* spp.) did considerable damage at the start, but a fair stand of plants out-lived their attacks and gave a moderate crop of fruits. During the bearing season, however, the plants were attacked by large broods of cucumber lice: (*Aphis Cucumeris*, Forbes,) and the plants finally succumbed to these and the dry weather, so that the fruiting season was prematurely ended.

Measurements in the following descriptions are for mature specimens.

No. 2. CHICAGO GIANT.—Vines coarse, with heavy stems, but only moderately vigorous; leaves large, rough, coarse, on heavy, irregular petioles; fruit large; irregular, ill-shapen, usually bent or unequally developed;

best specimens measure 20x8 cm. (7.9x3.1 in.); ripening very light colored; spines few, large, black; flesh thin and not firm.

No. 3. EARLY CLUSTER.—Vines rather weak, medium length; leaflets rather small, smooth and light green; fruit regular, smooth sub-cylindric, 16x6 cm. (6.3x2.4 in.); spines few, large, black; color when ripe rather light orange yellow in some parts shading to a light brown; flesh thick and solid.

No. 4 EARLY FRAME.—Vines of medium size strength and color; fruit as grown in this plot a little irregular, generally long, cylindric-pyriform, 16x7 cm. (6.3x2.8 in.), ripening smooth bright yellow; spines few, large, black; flesh medium thick.

No. 5. EARLY NETTED RUSSIAN. An uneven lot, so badly mixed that all notes are doubtful. The following description is from a specimen which represents what seems to be the prevailing type:

Vines small, weak; fruit borne singly or in pairs, small, 11.5x6 cm. (4.5x2.4 in.), cylindric-oval, short, ripening dark orange yellow, often deepening into dark brown, the surface becoming chartaceous and cracked; spines many, small, black; flesh thick; seed cavity small.

No. 7. EVERBEARING.—Vines very small and weak, scarcely running; fruit 11x6 cm. (4.3x2.4 in.), to 14x7 cm. (5.5x2.8 in.), oval or oval cylindric, smooth, ripening to dark orange yellow, occasionally showing a shade of brown and more infrequently the chartaceous and cracked surface noted in specimens of the netted Russian type; flesh medium thick, seed cavity rather large.

No. 8. EXTRA EARLY GREEN PROLIFIC.—Vines slender, lying close to the ground, rather light colored; internodes long and slender; fruit usually borne at seventh or eighth node, singly or in pairs, thickly set with small black spines, regular oval, 12x6 cm. (4.7x2.4 in.), dark orange yellow, at length deep orange brown, the surface becoming chartaceous and cracking so as to present a netted appearance similar to netted Russian flesh solid; seed cavity small.

The lot is variable. The description is made from the predominant. Type comparison with netted Russian; this lot has stronger, more freegrowing vines and longer fruits.

No. 13. LONG GREEN CHINA.—Vines straggling, coarse, long jointed; leaves medium size, on large, crook-

ed petioles; fruit very irregular, good specimens measure 36x6 cm. (14x2.4 in.) irregular and usually curved, ripening white or greenish gray; spines few, large and white.

No. 14. IMPROVED LONG GREEN.—Vines medium strong and free growing; leaves large, thick, rather dark green; petioles strong, erect; fruit large, 25x7.5 cm. (9.8x3 in.) irregularly cylindric, smooth or slightly ribbed, color when ripe light greenish yellow; spines few, large, black; flesh variable in thickness.

Not a prolific variety in this experiment.

No. 15. NEW SIBERIAN.—Vines very slender, medium free growing; leaves thin, small; petioles weak; fruit often borne in pairs, 12x8 cm. (4.7x3.1 in.) or smaller, regular oval, smooth, ripening deep orange, at length showing patches of brown, chartaceous, cracking integument very similar to the Netted Russian which this fruit resembles in all respects; spines many, small, black; flesh thin, seed cavity large.

No. 16. NICHOL'S MEDIUM GREEN.—Vines vigorous, rather strong; leaves large, thick, on petioles of medium strength; fruit 14.5x6 cm. (5.7x2.4 in.), smooth and regular, subcylindric tapering very slightly toward either end; color when ripe orange yellow deepening into a rusty brown, spines few, large, black; flesh thick; seed cavity small.

No. 17. PARISIAN PROLIFIC PICKLE.—Vines rather weak to medium strong; leaves medium or large, rather dark green; fruit 27x7 cm. (10.6x2.8 in.), straight or a trifle curved, usually indistinctly ribbed, tapering toward both ends especially toward the stem, ripening light golden yellow, sometimes turning darker; spines many, small, black; flesh thick; seed cavity small.

No. 18. SERPENT OR SNAKE.—Vines long and strong; leaves large, thick, rounded, slightly and unevenly denticulate; petioles short, strong; fruit 75 cm. (30 in.) long or longer, 7 or 8 cm. (2.8 or 3.1 in.) in diameter, very much bent, surface longitudinally fine corrugated, nearly smooth puberulent, tardily ripening to a deeper yellow, flesh thin, when ripe bearing much the appearance of musk melon; seeds large, white.

This peculiar plant is quite distinct from the ordinary cucumber. It is classified botanically with another species.

No. 19. WETHERSFIELD CHICAGO PICKLE, Select.—Vines rather weak, not running far; leaves small, on short

petioles; fruit 28x7 cm. (7.1x2.8 in), tapering toward both ends, ripening orange yellow, at length becoming brownish but never chartaceous or cracking; spines few, large, black; flesh thick and firm; seed cavity very small.

This appears to be a very prolific variety.

No. 20. ARLINGTON WHITE SPINE.—Vines rather vigorous but not running far; leaves large, thick, dark green; petioles long, strong; fruit 27x7 cm. (10.6x2.8 in.), subcylindric, usually tapering slightly toward both ends, especially toward the stem, usually very slightly ribbed, ripening white to greenish gray with faint longitudinal lines of lighter shade, spines few, large, white; flesh and seed cavity medium.

No. 21. BENNET'S WHITE SPINE.—Not distinct from No. 20; but vines more free-growing and less prolific. Individuals less uniform than No. 20.

No. 22. EVERGREEN WHITE SPINE.—Not at all different from No. 20.

No. 23. EXTRA LONG WHITE SPINE.—Conforming to the description of No. 20, but resembling more No. 21; also a trifle later in ripening.

No. 24. IMPROVED WHITE SPINE.—Not different from No. 20.

No. 25. PEERLESS WHITE SPINE.—Apparently the same as No. 20; but not growing so well in this experiment.

No. 27. NOA'S FORCING.—Vines very large, coarse, short jointed; leaves very large somewhat acute.  
A poor stand. Did not fruit.

No. 29. TAILBY'S HYBRID.—It is doubtful if this seed is true to name. The specimens in this experiment resemble in general the Netted Russian.

Vines very small and weak; leaves small, deeply lobed; petioles very weak; fruit borne singly or in pairs, 10x6.5 cm (3.9x2.6 in.), oval, ripening deep orange, later becoming brown, chartaceous and cracking; spines many, small, black; flesh rather thin and seed cavity large.

## TABLE.

Giving the number of cucumbers of pickling size pick-



ed from the several varieties.

No.	1.	Athens, or Grecian.....	0
"	2.	Chicago Giant.....	14
"	3.	Early Cluster.....	67
"	4.	Early Frame.....	41
"	5.	Early Netted Russian.....	70
"	6.	Early White Japan.....	5
"	7.	Everbearing.....	83
"	8.	Extra Early Prolific.....	109
"	9.	Giant White.....	6
"	10.	Gherkin, Small West India.....	1
"	11.	Green Prolific, or Boston Pickling.....	37
"	12.	Japanese Climbing.....	6
"	13.	Long Green, Chinese.....	51
"	14.	Long Green, Improved.....	31
"	15.	New Siberian.....	108
"	16.	Nichol's Medium Green.....	134
"	17.	Parisian Prolific Pickle.....	155
"	18.	Serpent, or Snake.....	37
"	19.	Wethersfield Chicago Pickle, Select.....	275
"	20.	White Spine, Arlington.....	82
"	21.	White Spine, Bennett's.....	53
"	22.	White Spine, Evergreen.....	181
"	23.	White Spine, Extra Long.....	77
"	24.	White Spine, Improved.....	11
"	25.	White Spine, Peerless.....	15
"	26.	Giant Pera.....	7
"	27.	Noa's Forcing.....	0
"	28.	Rollison's Telegraph.....	0
"	29.	Tailby's Hybrid.....	105

### Experiment 23—BEETS.

Twelve varieties of beets were included in this experiment. They were planted April 15th in rows four and one-half feet apart, the seed being drilled. Each variety had 90 feet of row. The seed was bought of different seedmen, as named in the notes of varieties below. They grew very slowly, but in the end gave a very satisfactory crop. They were all dug October 10th and 11th, at which time the accompanying brief descriptive notes were made of the edible roots.

NO. 1. BASTIAN'S EARLY;—Trumbull, Streat & Allen. Dark red, a little rough, irregular in form, somewhat flattened; rootlets small and few.

NO. 2. COLUMBIA;—Burpee. Dark red, smooth, small, globose or a little flattened; rootlets small, few.

NO. 3. EARLY RED TURNIP;—Trumbull, Streat & Allen. Light red, usually rather smooth, obconic; rootlets several, scattered.

NO. 7. EARLY BASSANO;—Trumbull, Streat & Allen. Subglobose or obconic, not much branching below, light pink, nearly white inside with thin layers of red flesh.

NO. 8. EARLY BLOOD TURNIP;—D. M. Ferry. Irregular in form, usually long obconic, large tap root, flesh in about equal layers of dark red and white.

NO. 9. IMPROVED BLOOD TURNIP;—Burpee. Subglobose or flattened, small, straight tap root, dark red, flesh deep red.

NO. 10. LONG DARK BLOOD;—D. M. Ferry. Long and tapering, 6x9 cm. (2.4x3.5 in.), dark red; flesh deep carmine, very fine.

The weights taken at digging are compared in the following table.

No.	VARIETIES.	Seedsman.	Weights		
			Total weight pounds.	Weight 10 best.	Average 10 best.
1.	Bastian's Early	T. S. A.	75.5	20.5	2.0
"	2. Columbia	Burpee	48.7	11.2	1.1
"	3. Early Red Turnip	T. S. A.	119.7	24.5	2.5
"	4. Eclipse	T. S. A.	64.2	15.6	1.6
"	5. Eclipse	Maule	37.9	17.6	1.8
"	6. Ex. Ey. Eclipse	Ferry	92.8	15.9	1.6
"	7. Early Bassano	T. S. A.	35.7	17.6	1.8
"	8. Early Blood Turnip	Ferry	134.9	24.3	2.4
"	9. Improved Blood Turnip	Burpee	57.3	11.9	1.2
"	10. Long Dark Blood	Ferry	95.2	27.8	2.8
"	11. " " "	T. S. A.	22.3	9.0	0.9
"	12. Market Gardeners'	Maule	22.0	13.7	1.4

NOTE 1.—The names in the third column show the seedsmen furnishing the seeds. "T. S. A." stands for Trumbull, Streat & Allen.

Note 2.—The second column of figures shows the weight of the ten best specimens in each lot. The averages in the next column as will be seen, are the averages of the ten best. All weights are made after removing all leave.

### Experiment 24—RADISHES.

Five varieties of radishes were sown in drills in the open ground April 14th and 15th,—numbers 1 and 2 on the 14th, and numbers 3, 4 and 5 on the 15th. The rows were four and one-half feet apart as with other garden vegetables, and much of the cultivation was given with the horse and five tooth cultivator.

The crop in general might be rated as a moderate success. Radishes fairly good for table use were produced in each number. The notes made of the separate varieties are as follows:

No. 1. EARLY SCARLET BUTTON.—Small, globular, dark red; average specimen has vertical and horizontal diameter of 3 cm. (1.2 in.); tops small, 12—15 cm. (4.7—5.9 in.) long; leaflets spatulate, regularly lobed or divided, young petioles stiff-spinulose.

No. 2. FRENCH BREAKFAST.—Uneven in size and shape, average specimen oval, 2x5 cm. (.8—2 in.), medium deep red shading into white below, early crisp and mild but soon becoming tough, pithy and pungent; leaves somewhat irregular 12—15 cm. (4.7—5.9 in.) long; petioles retrose spinulose.

No. 3. LONG SCARLET SHORT TOP.—Trumbull, Streat & Allen. Very even stand in row and moderately even in size and shape, 9—13 cm., 3.5—5.1 in.) long by 2—2.5 cm. (.8—1 in.) in diameter, crimson, tipped with white, crisp and of good quality at first but early becoming very pithy; leaves 15 cm. (5.9 in.) long, irregularly lobed, petioles spinulose.

No. 4. LONG SCARLET SHORT TOP.—Ferry. Same as No. 3, but did not make so good a stand.

No. 5. WHITE STRASBURG.—Gave a good, even stand. Roots white, smooth, obconic, 6 cm. (2.4 in.) long by 3.5 cm. (1.4 in.) in diameter, tender but not crisp; leaves rather light green, spreading, 15—20 cm. (5.9—7.9 in.) long, rather broad, irregularly lobed or cut, petioles

thickly spinulose

This was one of the best sorts grown on the grounds in 1893. It was not so early as other varieties and not so good in texture for early table use; but it remained in good edible condition much longer and is really a desirable table sort, judging from its showing in this case.

### Experiment 25—LETTUCE.

April 13th there were planted thirteen varieties of lettuce. These were sown in drills and cultivated with horse cultivator and hoe like all other vegetables. Nearly all made a remarkably good growth and gave a fine crop under this treatment.

In examining the descriptive notes it will be well to remember that the first part of each description was made when the lettuce was ready for the table; and that the other characteristics were noted after the plants were in seed.

**No. 1. BOSTON MARKET.**—Plants medium size, dark green, very much resembling Henderson's New York, leaves large, very broad, moderately wrinkled, margin finely denticulate, veins small; of medium texture and quality though inclined to be bitter; at seed time very uneven in height, average 83 cm. (32.7 in.); umbel subglobose, irregular, cauline leaves diminishing rapidly in size upward and becoming mere bracts at first branches; seeds white.

**No. 2. DENVER MARKET.**—Plants large, tardily and loosely heading, light green; leaves comparatively short with very broad top, the broadly winged petioles medium long, average leaf is 17 cm. (6.7 in.) long including petiole, 19.5 cm. (7.7 in.) broad; mid-nerve very large up to where the small veins are all given off at once, inter-nerve portions very conspicuously wrinkled, margin sparingly and finely denticulate; texture good; quality fair; mature plant 90 cm. (35.4 in.) high, umbel close and solid, rounded; cauline leaves large and numerous, becoming bracteate at branches; seeds white.

**No. 3. FRANKFORT HEAD.**—Plants medium size medium dark green, not heading; leaves medium size, broad, almost round, though slightly wrinkled having the appearance in the row of making a very smooth plant, margins entire; the characteristic mid-nerve is small and

tapers evenly to the outermost point of the leaf, being notably straight; veins are given off from the mid-nerve at right angles and also tend to be excurrent; texture and quality of the best; mature plant 68 cm. (26.8 in.) high, stout and stocky, branching freely; branches strong, long, divaricate; umbel broad, large, loose, flat; cauline leaves rather small, extending far up among branches: branches covered with numerous sagittate, acute, half-clasping bracts; seed black.

Crop of this variety was not heavy as of several other varieties in the same experiment.

No. 4. GOLDEN QUEEN.—Plants small to medium size, light green; leaves broad and round with but little petiole, nearly smooth, thin; margin entire; mid-nerve small and excurrent; veins radiate; texture good; quality fair; mature plant 85 cm. (33.5 in.) high, uneven, branching freely with appressed branches of very unequal length making an irregular umbel; small cauline leaves continued far up into umbel; branches bracteate with small, somewhat obtuse, sub-clasping bracts which are rounded and sharply denticulate below; seeds white.

Does not stand hot sun so well as other varieties in same experiment.

No. 5. HANSON.—Plants large and vigorous; inclined to head loosely; leaves medium large, broad, abruptly tapering below into a narrow petiole, thick and wrinkled, especially the edges evenly plaited; margin thickly and conspicuously denticulate; mid-nerve much branching, barely excurrent; texture fair; quality good; mature plant 75 cm. (29.5 in.) high, rather uneven, umbel large, rather flat, large cauline leaves extending well up to inflorescence but usually not into it; bracts of branches small, inconspicuous, cordate, clasping; seeds gray.

This was, all things considered, much the best lettuce in the experiment.

No. 6. HARDHEAD.—Plants medium small, dark green, mottled and tipped with dark, reddish brown; leaves loose and drooping, small, comparatively narrow, 10 cm. (3.9 in.) long by 9 cm. (3.5 in.) broad; slightly wrinkled margin very finely denticulate; mid-nerve excurrent; veins small, branching at right angles; texture a little tough and leathery; quality second rate; mature plant 55 cm. (21.7 in.) high, a little uneven; umbel medium size, spreading; cauline leaves small; inflorescence conspicuously and evenly bracteate with auriculate, cuspidate bracts.

clasping, often meeting at margins, backs mottled with purple; involucre bracts purple with cinereous tips; seeds white.

A late variety.

No. 7. **LARGE DRUMHEAD**—Only gave a few plants and these were not uniform enough to warrant a description. At maturity the plants were better developed standing at an average 63 cm. (24.8 in.) high; umbel large, rounded; cauline leaves crowded, extending well up into inflorescence; bracts of branches large, long, acute or obtuse, clasping, sharply denticulate below; upper bracts small, auriculate, clasping; seeds white.

No. 8. **NEW ICEBERG**.—A poor stand. Plants medium to large, at length heading solidly, one plant 28 cm. (11 in.) in diameter; leaves medium size, medium dark green, thick, somewhat curled; margin irregularly plaited, conspicuously denticulate; mid-nerve barely excurrent; veins large and irregular; texture medium; quality medium; mature plant 72 cm. (28.3 in.) high, uneven, umbel medium small, dense; cauline leaves rounded below, diminishing rapidly upward, becoming bracts some distance below the inflorescence; bracts of inflorescence very small, between cordate and auriculate, clasping, larger ones denticulate below, flowers dull in color; seeds gray.

No. 9. **NEW SENSATION**.—Plants medium size, 20 cm. (7.9 in.) in diameter, low, medium green; leaves medium size, round, often slightly emarginate, thin, slightly wrinkled, entire or finely denticulate, mid-nerve small, excurrent; veins small, branching at right angles; texture and quality fair; mature plant 65 cm. (25.6 in.) high; umbel loose, medium size; cauline leaves numerous, irregular, extending to inflorescence; bracts of inflorescence small, cordate or sagittate, clasping; flowers large; seeds black.

No. 10. **NEW YORK**.—Plants large and thrifty, 25 cm. (9.8 in.) in diameter, dark green, heading solidly; heads 6–9 cm. (2.4–3.5 in.) in diameter; leaves large, broad, tapering below, thick, moderately wrinkled; margin irregularly denticulate; mid-nerve excurrent; veins divaricate but not making right angles with mid-nerve; texture and quality medium; yield large, mature plant 78 cm. (30.7 in.) high; umbel medium size; cauline leaves large and crowded below, soon becoming bracteate or leaving stem nearly bare for some distance below inflorescence; bracts very small, closely appressed, clasping,

cordate or auriculate; seeds gray.

As grown in this experiment this is a prolific and desirable variety.

No. 11. PHILADELPHIA BUTTER.—Plants small, irregular, light green, not heading, soon running to seed; leaves medium size, oval, rather narrow, but very little wrinkled; margin very finely denticulate; mid-nerve large, often spinose at back, excurrent, veins small, given off at right angles; texture fair; quality inferior; mature plant 55 cm. (21.7 in.) high, stocky, branching very widely, making broad, large, umbel; cauline leaves irregular extending well up to inflorescence; inflorescence leafy-bracteate, with many large and small bracts intermingled; bracts cordate, auriculate or acute, triangular, clasping; flowers large; seeds white.

Not a thrifty lot in this experiment.

No. 12. TRIANON (Cos).—Plant at maturity 85 cm. (33.5 in.) high, strong and upright; stems having a tendency to become flattened; cauline leaves crowded, medium large, extending nearly to inflorescence; inflorescence nearly naked; bracts small, auriculate, closely appressed; seeds white.

No. 13. DUTCH BUTTER.—Mature plant 58 cm. (21.8 in.) high; umbel loose, straggling; cauline medium leaves size and number, diminishing to bracts at or below inflorescence; bracts cordate or auriculate; larger ones denticulate below; flowers large, spreading, light yellow, seeds white.

## Experiment 26—POTATOES.

Eleven lots of potatoes were planted with the results shown in the following notes and table. They did not make a good growth, and even the best crop was not encouraging.

No. 1. BEAUTY OF BEAUTIES.—Medium size, though rather irregular both in size and form; oval, rather strongly flattened; skin white, smooth; eyes few, medium deep.

No. 3. EARLY OHIO.—Marketable potatoes even and regular, oval and a little flattened; eyes few and shallow; skin gray and smooth, seldom having a trace of pink. The lot has a few indications of scab and insect work.

No. 4. EARLY ROSE.—Small, oval, flattened, regular, skin light gray. Slightly affected with scab.

No. 6. POLARIS.—Medium size and even, globose or irregularly blocky, skin smooth with a trace of pink; eyes rather deep.

No. 7. SUNRISE;—Trumbull, Streat & Allen. Small to medium, running even in size, moderately regular, smooth, white; eyes few and shallow.

No. 8. SUNRISE;—F. Barteldes. Quite different from No. 7, and more probably the correct type. Subglobose or oval and flattened, a little irregular, smooth; skin yellowish or pinkish, decidedly darker than in No. 7; eyes shallow, few.

No. 9. VAUGHAN;—F. Barteldes. A poor lot. Small and uneven in size, rather regular in form, smooth, oval, flattened; skin white; eyes few and very shallow.

No. 10. VAUGHAN;—Vaughan. Small, irregular, varying from globose to oval and flattened; skin mostly smooth, whitish or gray; eyes irregular. The lot shows a few traces of scab.

VARIEITY.	Total product	Marketable product.	Per cent marketable.	Ten largest weigh.
No. 1. Beauty of Beauties.....	47.7	17.0	35	2.9
" 2. Beauty of Hebron.....	22.4	.0	0	1.1
" 3. Early Ohio.....	49.2	12.4	25	2.4
" 4. Early Rose.....	88.6	11.8	13	1.4
" 5. Freeman.....	45.7	13.0	28	1.8
" 6. Polaris.....	49.8	4.4	9	2.2
" 7. Sunrise; T. S. & A.....	45.4	15.8	34	3.5
" 8. Sunrise; Barteldes.....	57.4	4.4	8	1.8
" 9. Vaughan; Vaughan.....	44.0	6.5	15	1.8
" 10. Vaughan; Barteldes.....	39.6	5.2	13	2.2
" 11. World's Fair.....	25.0	.0	0	1.8

Note 1. Total product and marketable product are computed to the ten pounds of seed planted. Thus No. 1 yielded at the rate of 47.7 pounds to the ten pounds of seed planted.

Note 2. The potatoes were graded by placing among unmarketable those which passed through an opening three inches in diameter. Those classed as marketable were too large to pass.

The results given in this table show that Sunrise No. 8 gave the largest total yield; Beauty of Beauties No. 1 gave the largest marketable product and also the largest percentage of marketable tubers; while the few largest tubers in the experiment came from Sunrise No. 7.



## Experiment 28—TURNIPS.

This experiment was, in most respects, unsatisfactory. The seed was, from the press of circumstances, sown at a time and a manner seldom adopted in growing turnips. However all varieties had equal opportunities; and comparisons within this single experiment may not be very unfair. The following condensed notes are prepared from the observations taken.

No. 1. GOLDEN BALL.—Small, regular, ovate, tapering below with several large rootlets running downward; skin rather smooth, yellow; flesh golden yellow, rather coarse and tough. Tops not noted.

No. 4. EARLY WHITE FLAT DUTCH.—Large, horizontal diameter 13 cm. (5.1 in.), strongly flattened, having a small tap root from which branch the few smaller rootlets; skin white; flesh white, tender and sweet; tops medium size; leaves not much divided; petioles either white or purple above.

One of the most successful sorts in the list.

No. 5. HALF LONG RED TOP.—Spindle shaped or simulating a carrot, 15x4 cm. (5.9x1.6 in.), a few small lateral rootlets given off from the lower half; skin white; flesh white, coarse, tough, tasteless; tops rather erect, very dark green or reddish purple; petioles above white to purple.

No. 7. PURPLE TOPPED STRAP LEAVED.—(Seeds from D. M. Ferry.) Small in size, 9 cm. in diameter, slightly flattened, smooth and regular, having a distinct tap root with or without small, branching rootlets; skin white; flesh white, rather coarse and strong flavored; tops small, purple; leaves but little divided.

No. 8. PURPLE TOPPED STRAP LEAVED.—(Seeds from Trumbull, Streat & Allen.) Small, 9 cm. (3.5 in.) in diameter, strongly flattened, regular, with a distinct tap root having a few branches; skin white; flesh white, moderately good texture, tasteless; top small, purplish leaves not much divided.

No. 9. RED TOP FLAT NORFOLK.—As grown in this plat not flat at all, but globose or obconic with a few large rootlets below; skin and flesh white; tops strong and spreading; petioles usually purple above and along the edges.

No. 11. WHITE GLOBE.—Small to medium size, globose and tapering below with many large rootlets from the base of the turnip proper; skin and flesh white.

TABLE.

VARIETY.		Total weight.	Roots.	Marketable roots.	Per cent marketable.	Ten best.
No. 1.	Golden Ball.....	48.0	11.9	25	4.9	
" 2.	Purple Top Golden Yellow Swede	7.9				
" 3.	Cow Horn.....					
" 4.	Early White Flat Dutch.....	22.9	9.7	42	5.3	
" 5.	Half-long Red Top.....	11.0	4.0	36		
" 6.	Large White Flat Norfolk.....	13.9				
" 7.	Purple Top Strap Leaved, Ferry..	12.3	7.9	64	3.5	
" 8.	" " " " T. S. & A.	20.3	8.4	41	5.7	
" 9.	Red Top Flat Norfolk.....	15.0	5.7	36	2.2	
" 10.	White Egg.....	11.7				
" 11.	White Globe.....	25.2	6.2	25	4.9	

Note.—Weights are all in pounds.

## RECOMMENDATIONS.

Oftener than any other question the experiment station worker has to answer the query of what varieties to plant. Though there are many and serious limitations placed upon the man to whom these questions are put, he may nevertheless make qualified answers, which, if given their proper interpretation, may often be of great value. All the matter of this bulletin bears upon the question of what to plant; but the following varieties are given special mention, it being the judgment of the men who watched the experiments that those thus mentioned showed a more or less marked superiority in the tests reported.

PEAS.—Champion of England, No. 7, was of extra quality and a very strong grower. In fact varieties more dwarf in habit might often be preferred. Of these Tom Thumb, No. 6, is to be recommended. Stanley, No. 4, is a very good variety for home use.

BEANS.—Henderon's Bush lima was the only variety reaching a development which would warrant a recommendation. This variety did remarkably well. It can be planted any where with confidence. It is a superior bean for shelling either green or dry.

MUSK MELON—Jenny Lind, No. 19, was best in quality, being an exceedingly delicious table melon. Early Netted Gen, No. 20, was very good. Perfection,

No. 24, was fine. Banquet, No. 3, was very attractive in appearance and color of flesh, and was of moderately good quality.

**WATER MELONS.**—Though the crop attained nothing like a normal development, the excellence of a few varieties under the conditions was very plain. A few gave a fair product in fruit. Of these the best were Hungarian Honey, No. 18; Mountain Sprout, No. 24; Jones' Jumbo, No. 21; and Vick's Extra Early, No. 34.

**CUCUMBERS.**—All strains of the White Spine gave good satisfaction, though by reference to the table of pickings a considerable discrepancy in the product will be noticed. This was due to difference in earliness, the entire experiment having been badly damaged late in the season by dry weather and plant lice. Wethersfield Chicago Pickle, No. 19, gave the largest crop of pickling cucumbers. After this ranked New Siberian, No. 15; Parisian Prolific Pickle, No. 17; and Nichol's Medium Green, No. 16. The Snake, or Serpent cucumber is an attractive oddity. It is a strong grower and prolific. Some pickles made from it were of superior quality.

**BEETS.**—Long Dark Blood, No. 10, was the most attractive in the list and gave the largest beets; though it will be seen by the table that Early Blood Turnip, No. 8, and the Early Red Turnip, No. 3, gave the largest yields.

**RADISHES.**—French Freakfast, Long Scarlet Short Top and the globe-shaped varieties gave the satisfaction which they usually render; but White Strasburg, No. 5, was in many respects superior to all others grown in this experiment.

**LETTUCE.**—Hanson, No. 5, was the most satisfactory variety grown in this experiment. Boston Market, No. 1, and New York, No. 10, were also extra fine.

**POTATOES.**—The Beauty of Beauties, No. 1, made the best showing of those planted. It is a variety which can be safely recommended. One lot of Sunrise stood second in the experiment. This is also a good variety.

**TURNIPS.**—Early White Flat Dutch gave best satisfaction.

**SALSIFY.**—Though not mentioned in the foregoing bulletin notes, the Mammoth Sandwich Island Salsify, or vegetable oyster, was grown on the grounds with marked success. It ought to be grown in every private garden.

## GLOSSARY.

Explanation of unfamiliar terms used in this Bulletin.

- Acuminate.* Tapering at the end. Long pointed.
- Acute.* Terminating with a sharp or well defined angle.
- Anterior.* The forward end, or toward the forward end.
- Appressed.* Lying close and flat against.
- Attenuate.* Slenderly tapering; becoming very narrow.
- Auriculate.* Ear shaped; or furnished with an ear shaped appendage.
- Bract.* A more or less modified leaf; properly one subtending a flower or belonging to an inflorescence.
- Bracteate.* Bearing bracts.
- Calyx.* The (usually) green leaf-like appendages commonly found just outside the colored part of a flower. The outer perianth of the flower.
- Cauline.* Belonging to the stem.
- Chartaceous.* Having the texture of writing paper.
- Cinereous.* Ash-colored.
- convolute.* Rolled up longitudinally; particularly when rolled forward.
- Cordate.* Heart shaped.
- Cuspidate.* Pointed by a tooth, or with a tooth shaped point.
- Dentate.* Toothed along the margin.
- Denticulate.* Minutely dentate.
- Divaricate.* Widely divergent.
- Divided.* Said of a leaf when it is lobed or cut to the base.
- Entire.* Without toothing or division. Used to describe leaf margins.
- Excurrent.* Running through; as the nerve of a leaf running quite to the outer point.
- Explanate.* Spreading out flat.
- Globose.* Nearly spherical.
- Hilum.* The scar or point of attachment of the seed.
- Inflorescence.* The flowering part of a plant.
- Integument.* Any natural covering. A skin.
- Interneural.* Between the nerves.
- Internode.* The space between two nodes.
- Involucral.* Of the involucre. Involucral bracts are the small ones just outside the heads of flowers in Compositæ.
- Longitudinal.* Running lengthwise.
- Node.* The point upon a stem which normally bears a leaf or whorl of leaves.
- Obconic.* In the form of an inverted cone.

- Ovate*. Egg shaped. Used especially with reference to plane objects. Solids are ovoid.
- Petiole*. The stalk of a leaf.
- Posterior*. The back end, or toward the back end.
- Pyritiform*. Pear shaped.
- Recurved*. Curved downward or backward.
- Reniform*. Kidney shaped.
- Reticulate*. In the form of network.
- Reticulation*. Network. The marks or prominences which constitute the network.
- Revolute*. Rolled backward.
- Sagittate*. Shaped like an arrow head.
- Sinuate*. Strongly wavy. Said of leaf margins.
- Spine*. A sharp, more or less woody outgrowth. A rigid prickle.
- Spinose*. Spine like, or bearing spines.
- Spinulose*. Covered with small spines.
- Stipule*. A leaf-like appendage at the base of a petiole.
- Sub-* Used as a prefix to denote somewhat or slightly.
- Subcylindric, somewhat cylindric.
- Suture*. Technically a line of dehiscence. Used in this Bulletin to designate especially the longitudinal creases in musk melons.
- Truncate*. Ending abruptly as if cut off transversely.
- Umbel*. An inflorescence in which a cluster of peduncles or pedicels spring from the same point or nearly so.
- Ventral*. Belonging to the inner face of an organ. The opposite of dorsal—belonging to the back.
- Ventro posterior*. Belonging to the inner surface and back end.

## ANNUAL REPORT.

Receipts and Expenditures of the Oklahoma  
Experiment Station for the Year  
Ending June 30, 1893.

Received from the United States \$15,000.00.

### Expenditures.

For buildings.....	\$ 750.00
Bulletins.....	392.00
Expense of board.....	1250.45
Expense of director.....	67.98
Express and freight.....	189.09
Feed.....	497.81
Fencing and lumber.....	315.50
Implements.....	510.70
Labor.....	2878.37
Laboratory.....	1713.68
Library.....	92.55
Miscellaneous.....	181.20
Office supplies.....	108.95
Postage.....	99.80
Printing.....	68.50
Repairs.....	57.75
Salaries.....	4914.80
Seeds.....	252.33
Stock.....	420.82
Trees.....	64.04
Water supply.....	173.68

Total, \$15,000.00      \$15,000.00.

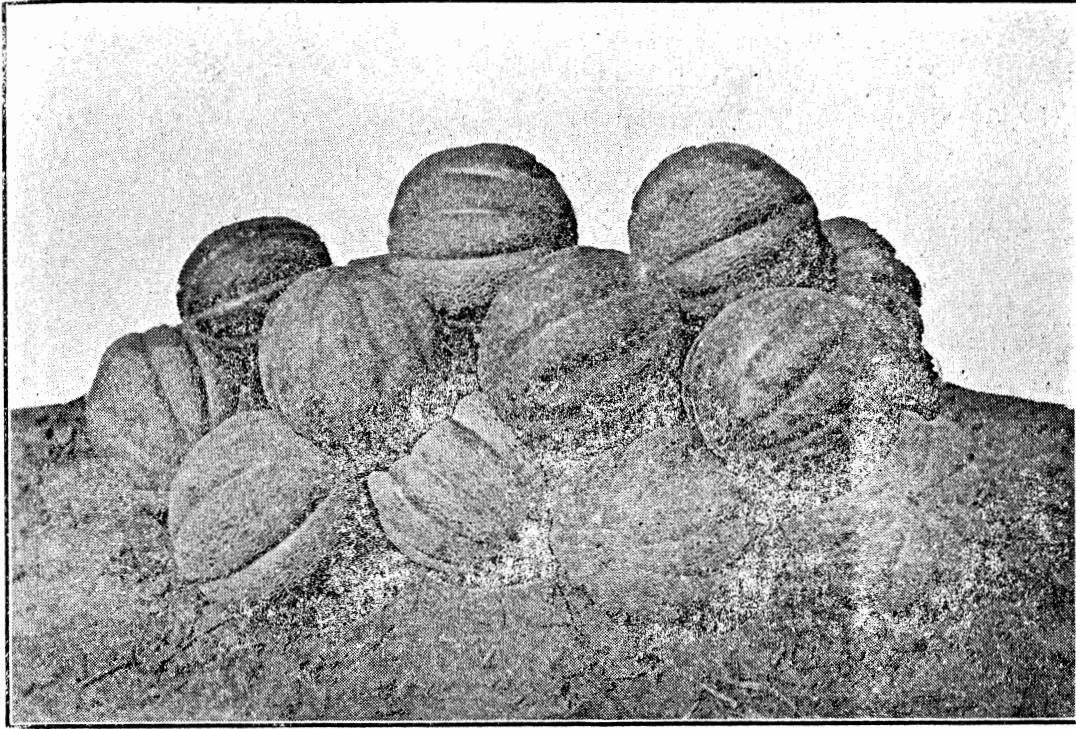
J. C. NEAL, Director.

Examined and approved:—

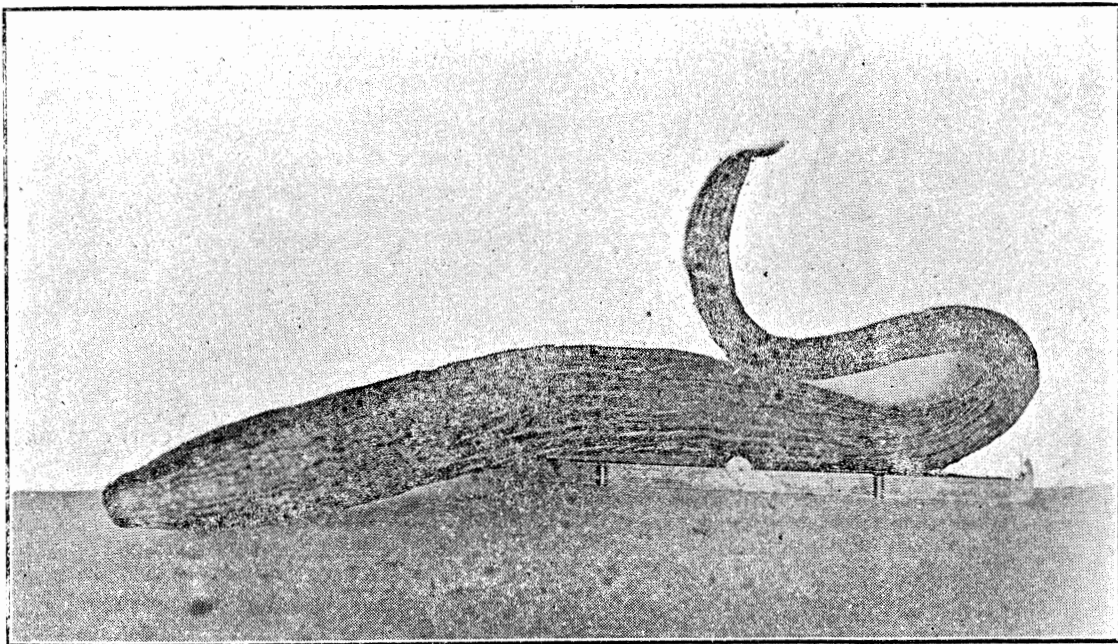
J. E. QUEIN,

W. H. CAMPBELL,

} Auditing Committee of Board  
of Regents.



MUSK MELON,—PERFECTION. See page 13.



CUCUMBER,—SERPENT OR SNAKE. See page 23.

J. O. Neal