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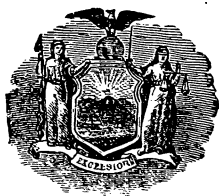
# New York State Agricultural Experiment Station

GENEVA, N. Y.

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## VARIATIONS IN VARIETIES OF CANNING PEAS

F. H. HALL



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## VARIATIONS IN VARIETIES OF CANNING PEAS

F. H. HALL

### SUMMARY

Seeds, from different sources, of each of eleven well-known varieties of canning peas were sown side by side in long plats. These "strains" within the varieties, as indicated by previous observations and in preliminary tests, differed in many factors of prime importance to either the grower or the canner, or both. The differences in several cases proved as great, or greater, between the "strains" than between similar, but distinct, varieties.

With these old varieties there were also grown eight new or little-known ones, already proved elsewhere to be adapted to commercial canning, or showing characteristics, in garden tests, that seemed to fit them for such use.

The method of harvesting, sampling, and handling the crops made it possible to secure very detailed data regarding each variety and strain; and general observations were taken at various intervals upon habits of growth, vine characters, and other features of interest, which are discussed in descriptions of the varieties. Of the new varieties, Horal, Late Alaska, Allan's Canner, and Badger show much promise for New York conditions; while Lincoln and Richard Seddon proved of splendid quality, but, possibly because of poor stand of vines, did not show sufficient productivity to justify recommendation without further trial.

Conditions surrounding the growth and sampling of the crops allow use of the figures secured *only* for comparisons in the test; they *must not be considered indexes* of possibilities in commercial pea growing.

### INTRODUCTION

In 1922, 1923, and 1924 more than 500 so-called "varieties" of peas were grown in short rows and studied at this Station. In the first and second years, marked differences were noted in peas of the same variety grown from seed secured in different pea-seed-producing areas, the differences, in case of some of the common varieties, being as great, or greater, from a horticultural or commercial standpoint, than those between different varieties. It was believed that these strain

variations were of considerable importance in the case of canning peas, since in this industry disease resistance, length of growing period, uniformity in maturing, percentage of pods usable, and grading of the peas are factors that may make one variety or strain a valuable one where another, quite similar in general garden qualities, would be useless for canning. Small-plat tests of several of these strains were made in 1923; but conditions made accurate results impossible, so no report was published. Sufficient information was secured, tho, to prove that the short-row differences between the strains were actual, not accidental, and of practical importance. Therefore, plans were made in the spring of 1924 for plat tests on a larger scale than in 1923, with a greater range of varieties, on land known to be in good condition, free from weed seeds, very uniform, and well adapted to the growth of peas.

#### PLAN OF EXPERIMENT

The soil on the area selected is a heavy clay loam, lightened by growth upon it of successive crops of alfalfa, with a crop of corn and one of sugar beets or mangels between crops of alfalfa which occupied the area from 5 to 12 years each, the succession extending back about 40 years. A depression running diagonally across one corner of the area, affecting three plats slightly, and a slight lightening in color of a smaller area on the opposite corner, with a little stiffer clay, which touched two plats, were the only observable soil differences over the entire area. Any fertilizing the soil received was on preceding crops and was uniform thruout the area. Weed seeds had been so thoroly worked out by the succession of crops, particularly by one of corn and one of mangels which preceded the peas, that only a few showed, mainly large ones in the blank strips between the plats which were easily removed by hand, without affecting any of the peas, either by their growth or by trampling of the vines to remove them.

The area was of such shape, without special planning, that one strip across it with an 11-hoe, 6-foot drill, made exactly 5 square rods, or  $1/32$  of an acre. It was found that to harvest all of each plat and have it handled separately at a commercial cannery was impracticable; so it was necessary to select definite fractional areas on each plat and harvest by hand. This made it possible to secure exceptionally accurate data with much detail; but since there was no

waste and all weights were made before the vines or peas lost moisture, the figures for product secured are much above what could be expected from any commercial handling. The crops were also far above the average for the year on fields near Geneva; as the seeding was heavy, the weather, after a very bad season before planting, greatly delaying it, was remarkably adapted to the pea crop on our heavy soil, and the soil itself seemed especially suited to the peas. These factors must be given much weight. They do not, it is believed, affect *comparisons* between plats; but prevent use of the figures as indexes for commercial yields or financial results with canning peas. It was planned to secure seed of the ordinary varieties from at least three sources—leading growers in different seed-pea-growing areas—but thru miscarriage one order for certain varieties was not filled; so two strains only could be compared in most cases; and at least one variety, a rather new but very promising and quite widely used one, was not obtained until too late to be sown with the others. Seed was also used of four new varieties, originated and distributed by the Wisconsin Agricultural Experiment Station, where valuable work is being done in pea breeding, with especial reference to disease resistance. Three other varieties were tested which are not known in New York as canners, but which seemed, from our short-row tests, to possess some desirable features. In all, 33 varieties or strains were used, which, with one exception, were sown May 21, more than a month late for smooth-seeded peas, and late even for wrinkled varieties. The land had been fitted and refitted repeatedly during mid-April and early May, but storms interfered with all attempts at sowing until May 8, when Horal was drilled in on Plat A; after which heavy rains and light showers came at short intervals for two weeks preventing use of a drill. Had typical summer weather followed the seeding on May 21, only poor crops could have been expected; but spring weather continued thru the growing season, so that ideal conditions were given for the development of the peas.

For sowing, an ordinary 11-hoe grain drill was used, which was tested for quantity of seed sown by using Horal seed, of which a considerable amount was available; and was finally set for about  $3\frac{3}{4}$  bushels to the acre. The last bouts on the Horal plat were sown at this rate, as were all the other plats when sown later. Each plat, except that of Horal, was, as said before, made by a single passage of the drill across the field, and all were sown the same day, May 21.

Between plats the drill wheel returned in the same track, leaving slightly more than 1 foot between the plats. This gave long, narrow plats, plainly separated by paths thru which an observer could readily pass, for study and comparisons; and roadways crossed each end of the area, making standpoints from which to study differences in color, height, and general habits of vines on adjoining plats, both with and against the sun.

General notes were taken repeatedly during the growing season; but are not discussed in detail in this bulletin unless they proved of horticultural value.

#### HARVESTING

The impossibility of having the product of each plat handled separately by a commercial cannery was ascertained too late to allow purchase or loan of small vining and grading outfits, for handling at the Station; so, for testing, a square area 6 feet on a side was cut from each plat with a sickle when the peas were considered in proper condition for canning. The square selected for cutting was taken at about the center of each plat in a belt across the field, shifting the position slightly if any irregularities in seeding or the influence of any specially favorable or unfavorable factors were evident. Such shifts were very rarely necessary, since the crop on each plat was remarkably uniform. Before each cutting, pods and peas were examined several times to be sure that as many peas as possible were of full size without any considerable percentage being too firm to cook up soft. In deciding upon this time, we were aided by experts from a Geneva cannery, who had also visited the plats several times previously during the season to compare varieties, and whose comments and estimates served as a check upon our own, with respect to varietal and strain characteristics and differences. These consultations were very useful to us; and the opportunity to study varieties under such good conditions for comparison was apparently appreciated by the experts. Many other visitors, including some officials and members of the State and National Cannery Associations, visited the plats at various times and were impressed by the differences shown between the varietal strains.

The vines on these accurately measured areas were cut by the writer, with a sickle, taking a drill-row at a time and counting the vines. The weighing of the vines was done on scales accurate to an eighth of a pound; of pods and peas on a spring balance scale, gradu-

ated to half-ounces and easily read to quarter ounces or less; and an ounce of peas of each grade was balanced against an ounce weight on a chemical scale sensitive to much less than the weight of the smallest pea. All weighings were made by the writer. All the pods were stripped from the vines by nimble-fingered assistants, separated (for the first few lots directly under the writer's supervision) into poor and usable grades, the latter including all pods with at least one well-developed pea. The two lots were then weighed separately and the pods counted by the assistants, with a recount if any suspicion of inaccuracy arose. Very rarely, however, did the recounts show appreciable error. The good pods were then shelled and the peas weighed in gross, against which weight the weights by grades were summed. If the results differed, the grade weights were again taken to detect any error, and, none being found, the bulk weight was again taken. In this way an explanation was found for every discrepancy; so it is believed the figures secured represent very closely the actual conditions, altho in some cases it is difficult to assign a logical cause for certain differences.

For grading, tin basins were used with the bottoms closely perforated by holes made with drills differing by  $1/32$  of an inch, from  $16/64$  inch to  $26/64$  inch. The grading, like the weighing, was done by the writer, the peas being shaken successively thru the basins, from large to small, until no peas would pass, each grade being placed in a labeled paper sack of the same size, for whose weight allowance was made by a set screw on the scales. Weights being found correct, a weighed ounce of each grade of peas was counted, except in a very few cases where the grading was so similar on pairs of plats that the number per ounce was found for only one of the pair. The peas were not counted in "trash," which consisted of peas passing the  $16/64$  inch sieve with a small amount of shell fragments, pieces of tendrils, and similar material. From these counts and weights it was possible to compute, for each plat, the total weight of crop per acre, the number of vines, the average number of pods per vine, the average number of peas per pod, the weight of usable and poor pods, the weight of refuse vines, the weight of shelled pods and of "trash," the total weight of refuse material, the total weight and weight by grades of the usable peas, the ratio of pea weight to pod weight, the percentages of pea weight in each grade; and, by using the prices commonly paid at New York canneries during 1924, the financial return on either graded or gross weight basis. Since 4 square yards

was taken as the unit area, the factor used for securing acre figures is 1,210. What seem to be the more important of these data will be found in Tables 1 and 2.

#### QUALITY

Since only small parts of the plats were taken for samples, abundant material remained for use as green peas, as well as for sending to a commercial cannery for processing and canning in the case of a few less well-known varieties. While kitchen cooking is not a complete guide to canning quality, it serves very well for comparisons; and in such comparisons the writer's judgment was supplemented by that of other members of the Station Staff, particularly those in the Division of Horticulture.

#### ACKNOWLEDGMENTS

For aid in collecting the desired strains of seed and of information regarding the varieties, we are indebted directly or indirectly to Prof. E. J. Delwiche of the Wisconsin Agricultural Experiment Station; to the N. B. Keeney and Son Co., Leroy, N. Y.; to the Jerome B. Rice Seed Company, Cambridge, N. Y., and particularly to Chas. P. Guelf and Wilder Brotherton, of that Company; to the Rogers Seed Company, Alpena, Mich.; to the J. H. Allan Seed Co., Sheboygan, Wis.; to the Everett B. Clark Seed Co., Milford, Conn.; to the Griswold Seed Co., Lincoln, Neb.; to Wm. Henry Maule, Philadelphia, Pa.; and to Geo. Tait and Sons, Norfolk, Va.

For their advice in the selection of the important factors to be considered in connection with canning peas, for information relative to grades and prices, for aid in deciding time to harvest the different varieties, for many useful suggestions made on their visits to the pea plats, and for the canning, for our judgment and theirs, of several lots of peas, we are under obligations to the officers and experts of the Geneva Preserving Company. To all the above companies and gentlemen we extend sincere thanks.

#### NOTES ON VARIETIES

##### GREEN, SMOOTH-SEEDED PEAS

*Alaska*.—The standard early canning pea. Seed grayish or bluish green, or in best strains pure medium green; originally smooth or very slightly pitted or dented, but strains from best breeders now distinctly pitted and dented, sometimes almost wrinkled. A pea of poor quality, starchy, frequently canning distinctly mealy; requires



added sugar for most palates, which commercial canners usually add in processing. The canned peas are of good color, which is retained well for slow serving. Often canned ungraded but gives a good percentage of small peas, the three strains grown in Station tests showing from 4 per cent to 7 per cent of No. 1's, and from 17 per cent to 27 per cent of No. 2's. The dry seeds run about 165 seeds to the ounce, but may vary widely for different strains (from 115 to 178 in samples from different sources received at the Station in the same year). This variation in seed size may result in thick or thin sowing with drills set to sow the same quantity per acre; as in Station tests where three samples sown in same drill with gears unchanged, produced at the rates of 562,600, 642,500, and 774,400 vines to the acre.

The green peas ready for canning show similar, tho not so great variations, the three samples referred to above running 93, 100, and 104 peas to the ounce of usable peas. Similar differences were also shown in the number of peas in the pod, averaging, in the three samples, 3.41, 3.79, and 4.14 usable peas.

The vines of the Alaska are slender, about  $1\frac{3}{4}$  to 2 feet long, but usually standing about a foot to 15 inches high, making them very easy to cut. The foliage is very fine and very light green. The vines in our tests carried about three pods, ready for the viner at practically the same time. The three samples in Station tests averaged, of usable and unusable pods, respectively, 2.55 and 0.38, 2.46 and 0.32, and 2.42 and 0.32. In other words 87 per cent to 89.8 per cent of the pods of each strain were usable at the same time.

*Alcross*.—An Alaska-type pea developed by the Wisconsin Agricultural Experiment Station from a cross between two strains of Alaska. In Station tests of 1924 it proved inferior to Alaska; but was more than a day earlier in reaching canning condition. This difference would undoubtedly be considerably greater in normal seasons. The seeds sown were slightly lighter in color than the better strains of Alaska and of practically the same size, producing at the rate of 631,600 vines to the acre. Vines showed the same color as Alaska, or a shade lighter, and the green peas were not quite as good in color. The vines averaged 2.6 pods apiece, of which 93 per cent were usable, a slightly better percentage than shown by the Alaskas, possibly because a day or more farther advanced than the Alaskas harvested at the same time. The yield was equal only to the poorest-producing Alaska, the pod production per vine being decidedly smaller, 3.87, as compared with 4.14, thus giving larger peas which did not grade as well. This made Alcross the poorest in financial return, when sold by grade, of any Alaska-type pea.

*Late Alaska*.—Another pea produced on the Wisconsin Station's breeding grounds, a selection from Alaska, which illustrates the wide variations now existing in this variety. Distinctly different from Alaska in season, being ten days later, and in color of vines, which are between medium green and dark green. They are also somewhat taller

and less slender than those of Alaska, giving more than a quarter more waste vines. This excess of vines is due in part, however, to the large number of vines, 701,800 per acre, produced by the same quantity of smaller seeds, which averaged about 130 to the ounce. The seeds are decidedly more pitted than other Alaskas, sometimes dented or almost wrinkled. These vines averaged 2.66 pods per vine, 87 per cent usable, and the pods  $3\frac{1}{3}$  usable peas. These are better color, both as shelled and in the can, than others of the type, and they graded very well, with 11 per cent 1's and 38 per cent 2's. This made Late Alaska, in spite of a comparatively small total yield, one of the best, when sold by grade, of any of the smooth green peas. It was also better in color and somewhat better in quality when canned. Use of the land for an extra ten days, however, must count against the variety; and the time of ripening would prevent handling with any other common smooth-seeded canning pea.

*Nonpareil*.—A large pea of the Alaska type, with vines of same character but bearing about one-sixth more pods per vine, of which practically the same percentage is usable at cutting time as of Alaska. Altho named "Extra Early Nonpareil" by some seedsmen, the variety shows no advantage over Alaska in this respect; while the peas do not grade as well, so that returns at canneries buying by size are no better than from Alaska, notwithstanding the higher yield produced by the better podding of the vines. The color of the peas, green or in the can, is not as good as that of the better Alaskas.

*Rice's No. 330*.—The original plant of this pea was found in a patch of a canning pea of French origin with very small cream-colored seed, which was extensively used in Michigan as a field pea and called, with many other varieties and types, Canadian Field peas. The ripe peas from this plant were mixed blue and cream in color, indicating hybrid origin; and other characteristics make it probable that the field pea and Alaska were the parents. Continuous selection has eliminated the cream seeds to a large extent, but something of the "saddle-backed" character of the original pods remains.

The green peas are small and grade well. Unfortunately seed of this variety was received too late to be included in the tests of 1924; but in preliminary tests of 1923 it gave more pods to the vine and more peas per pod, but a smaller yield per measured area, than other Alaska strain. In previous garden tests, Rice's No. 330 appeared to be later than Alaska; so harvesting with Alaska in 1923 may not have given a true idea of the productivity of the variety. The seeds are more like the old Alaska in smoothness, rather light in color, and with a small percentage of cream-colored peas. The variety is said to be very hardy and resistant to disease.

*Rogers' Winner*.—Developed by one of the oldest of the American seed-pea growers; but neither strain of stock under test was from the originator. Altho classed with the smooth green peas by size

TABLE 1.—TOTAL YIELDS, TOTAL AND GRADED YIELDS OF PEAS, GRADE PERCENTAGES, AND ESTIMATED RETURNS, ALL PER ACRE, FROM STRAINS OF CANNING PEAS.

VARIETY	PLAT NO.	TIME TO CUTTING	TOTAL YIELD PER ACRE	USABLE PEAS PER ACRE	WEIGHT PER ACRE OF PEAS PASSING SIEVES:						TRASH, Thru 16/64 in.	PERCENTAGES THRU SIEVES:						ESTIMATED RETURNS AT GRADE POUND PRICES:							AT GROSS WEIGHT PRICE	PLAT NO.	
					18/64 in.	20/64 in.	22/64 in.	24/64 in.	26/64 in.	Above 26/64 in.		18	20	22	Above 22	24	Above 24	Thru 18	Thru 20	Thru 22	Above 22	Thru 24	Above 24	Total			
		Days	Tons.-lbs.	Lbs.		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.								10c	8c	2 1/4c	1c					3c	
Horal.....	A	77*	13-1,830	3,895	1,319	1,092	1,295	151	29	—	227	34	28	33	5	—	—	\$131.90	\$ 87.36	\$ 29.14	\$ 1.80	—	—	\$250.20	\$116.85	A	
Alaska.....	2	56	8-1,621	3,574	264	983	1,919	378	—	—	86	7	27	54	11	—	—	26.40	78.64	43.18	3.78	—	—	152.00	106.32	2	
Alaska.....	3	56	9-1,587	4,065	246	851	1,985	983	—	—	151	6	21	49	24	—	—	24.60	68.08	43.66	1.83	—	—	138.17	121.95	3	
Alaska.....	5A	56	8-1,318	3,933	151	662	2,155	964	—	—	85	4	17	55	24	—	—	15.10	52.96	48.49	9.64	—	—	126.19	117.96	5A	
Alcross.....	1	56**	8- 562	3,574	217	539	1,872	946	—	—	132	6	15	52	27	—	—	21.70	43.12	42.12	9.46	—	—	116.40	107.22	1	
Late Alaska....	4	76	9-1,360	3,119	340	1,172	1,437	170	—	—	189	11	38	46	5	—	—	34.00	93.76	32.33	1.70	—	—	161.79	93.87	4	
Nonpareil.....	5	56	9- 755	4,177	302	548	2,080	1,247	—	—	284	7	13	50	30	—	—	30.20	43.84	46.80	12.47	—	—	133.31	125.34	5	
Rogers' Winner.	6	58	9- 755	4,159	416	945	2,647	151	—	—	227	10	23	63	4	—	—	41.60	75.60	59.56	1.51	—	—	178.27	124.77	6	
Rogers' Winner.	6A	58	8-1,848	4,160	492	1,342	2,250	75	—	—	227	12	32	54	2	—	—	49.20	107.36	40.63	.75	—	—	197.94	124.80	6A	
Green Admiral..	7	70	13-1,225	4,860	151	303	1,759	2,420	208	19	151	3	6	37	54	—	—	10c \$ 15.10	8c \$ 24.24	3c \$ 52.77	1 1/4c \$ 39.70	—	—	\$131.81	\$170.10	7	
Green Admiral..	8	70	14- 435	5,444	151	340	1,947	2,798	208	—	189	3	6	36	55	—	—	15.10	26.20	58.41	45.09	—	—	144.80	190.50	8	
White Admiral..	9	70	13-1,830	4,690	151	568	1,929	2,023	19	—	246	3	12	41	44	—	—	15.10	45.44	57.87	30.63	—	—	149.04	164.18	9	
Yellow Admiral.	10	70	13-1,830	5,105	151	605	1,853	2,391	104	—	170	3	12	36	49	—	—	15.10	48.40	55.59	37.44	—	—	156.53	178.67	10	
Advancer.....	11	71	14-1,645	7,109	38	264	908	3,630	1,929	340	151	—	4	13	—	52	31	10c \$30.20	8c \$72.64	—	2c \$ 72.60	1c \$ 22.69	\$198.13	3c \$213.30	11		
Advancer.....	12	71	15- 855	8,054	38	264	643	4,916	1,550	643	151	—	4	8	—	61	27	30.20	51.44	—	98.32	21.90	201.89	241.65	12		
Allan's Canner	13	70	13- 620	8,508	76	151	889	3,328	2,931	1,134	113	—	3	10	—	39	48	22.70	71.12	—	66.56	40.65	201.03	255.24	13		
Badger.....	14	69	13-1,225	5,597	170	643	2,193	2,401	170	19	151	—	15	39	—	43	3	81.30	175.44	—	48.02	1.89	306.65	167.91	14		
Canners' Gem...	15	62	10-1,780	4,613	57	473	775	1,475	775	1,059	76	—	11	17	—	32	40	52.90	62.00	—	29.50	18.34	182.74	138.39	15		
Canners' Gem...	16	66	11-1,595	4,688	57	473	889	1,512	850	907	133	—	11	19	—	32	38	52.90	71.12	—	30.24	17.57	171.83	140.64	16		
Horsford's M. G.	18	73	16-1,880	7,572	57	265	529	2,598	3,328	794	66	—	4	7	—	34	55	32.40	42.33	—	51.96	41.21	167.89	226.86	18		
Horsford's M. G.	19	73	16- 65	4,783	19	170	595	2,032	1,721	246	57	—	4	13	—	42	41	18.90	47.60	—	40.64	19.67	126.81	143.49	19		
Horsford's M. G.	5B	73	14-1,040	6,078	114	350	794	3,383	1,229	208	123	—	8	13	—	56	24	46.40	63.52	—	67.66	14.37	181.95	182.34	5B		
Horsford's M. G.	20	73	15- 855	7,061	75	388	784	2,599	2,231	983	123	—	7	11	—	37	45	46.30	59.72	—	51.98	32.14	190.14	211.83	20		
Lincoln.....	21	69	13- 620	4,688	57	406	1,021	1,890	851	463	95	—	10	22	—	40	28	46.30	81.68	—	37.80	13.14	178.92	140.94	21		
Perfection.....	22	66	12- 805	4,141	76	662	1,324	1,777	246	57	151	—	17	32	—	43	8	73.80	105.92	—	35.54	3.03	218.29	124.26	22		
Perfection.....	23	67†	12-1,410	4,102	170	454	1,210	1,682	435	151	76	—	15	30	—	41	14	62.40	96.80	—	33.64	5.86	198.70	123.06	23		
Prince of Wales.	24	74	12-1,410	5,312	38	57	151	378	510	4,178	57	—	2	3	—	7	88	9.50	12.08	—	7.56	46.88	76.02	159.36	24		
Prince of Wales.	25	74	12- 200	4,027	28	47	227	378	321	3,025	57	—	2	6	—	9	83	7.50	18.16	—	7.56	33.46	66.68	120.81	25		
Rice's No. 13...	26	76	13-1,830	4,311	132	529	1,097	1,551	699	303	189	—	15	26	—	36	23	66.10	87.76	—	31.02	10.02	194.90	129.33	26		
Rice's No. 13...	27	76	12- 200	3,782	114	473	785	1,351	794	265	151	—	15	21	—	36	28	87.70	62.80	—	27.02	10.59	159.11	113.46	27		
Richard Seddon.	28	60	6-1,613	1,966	378	170	718	284	416	38	—	—	19	8	—	37	36	53.80	13.60	—	14.36	7.00	72.74	58.92	28		
Surprise.....	29	58	7- 823	2,647	151	303	473	945	473	302	76	—	17	18	—	36	29	45.40	37.84	—	18.90	7.75	109.89	92.64	29		
Surprise.....	30	58	7- 823	2,849	38	189	340	983	1,021	378	38	—	8	12	—	33	47	22.70	27.20	—	19.66	13.99	83.55	103.00	30		

\*Sown May 8; when sown May 21, with all other plats, 70 days. \*\*Ready two days earlier. †Would have been better if held another day.

TABLE 1.—TOTAL YIELDS, TOTAL AND GRADED YIELDS OF PEAS, GRADE PERCENTAGE

VARIETY	PLAT NO.	TIME TO CUTTING	TOTAL YIELD PER ACRE	USABLE PEAS PER ACRE	WEIGHT PER ACRE OF PEAS PASSING SIEVES:						TRASH, Thru 16/64 in.
					18/64 in.	20/64 in.	22/64 in.	24/64 in.	26/64 in.	Above 26/64 in.	
		Days	Tons.-lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Horal.....	A	77*	13-1,830	3,895	1,319	1,092	1,295	151	29	—	227
Alaska.....	2	56	8-1,621	3,574	264	983	1,919	378	—	—	86
Alaska.....	3	56	9-1,587	4,065	246	851	1,985	983	—	—	151
Alaska.....	5A	56	8-1,318	3,933	151	662	2,155	964	—	—	85
Alcross.....	1	56**	8- 562	3,574	217	539	1,872	946	—	—	132
Late Alaska....	4	76	9-1,360	3,119	340	1,172	1,437	170	—	—	189
Nonpareil.....	5	56	9- 755	4,177	302	548	2,080	1,247	—	—	284
Rogers' Winner.	6	58	9- 755	4,159	416	945	2,647	151	—	—	227
Rogers' Winner.	6A	58	8-1,848	4,160	492	1,342	2,250	75	—	—	227
Green Admiral..	7	70	13-1,225	4,860	151	303	1,759	2,420	208	19	151
Green Admiral..	8	70	14- 435	5,444	151	340	1,947	2,798	208	—	189
White Admiral..	9	70	13-1,830	4,690	151	568	1,929	2,023	19	—	246
Yellow Admiral.	10	70	13-1,830	5,105	151	605	1,853	2,391	104	—	170
Advancer.....	11	71	14-1,645	7,109	38	264	908	3,630	1,929	340	151
Advancer.....	12	71	15- 855	8,054	38	264	643	4,916	1,550	643	151
Allan's Canner	13	70	13- 620	8,508	76	151	889	3,328	2,931	1,134	113
Badger.....	14	69	13-1,225	5,597	170	643	2,193	2,401	170	19	151
Canners' Gem...	15	62	10-1,780	4,613	57	473	775	1,475	775	1,059	76
Canners' Gem...	16	66	11-1,595	4,688	57	473	889	1,512	850	907	133
Horsford's M. G.	18	73	16-1,880	7,572	57	265	529	2,598	3,328	794	66
Horsford's M. G.	19	73	16- 65	4,783	19	170	595	2,032	1,721	246	57
Horsford's M. G.	5B	73	14-1,040	6,078	114	350	794	3,383	1,229	208	123
Horsford's M. G.	20	73	15- 855	7,061	75	388	784	2,599	2,231	983	123
Lincoln.....	21	69	13- 620	4,688	57	406	1,021	1,890	851	463	95
Perfection.....	22	66	12- 805	4,141	76	662	1,324	1,777	246	57	151
Perfection.....	23	67†	12-1,410	4,102	170	454	1,210	1,682	435	151	76
Prince of Wales.	24	74	12-1,410	5,312	38	57	151	378	510	4,178	57
Prince of Wales.	25	74	12- 200	4,027	28	47	227	378	321	3,025	57
Rice's No. 13...	26	76	13-1,830	4,311	132	529	1,097	1,551	699	303	189
Rice's No. 13...	27	76	12- 200	3,782	114	473	785	1,351	794	265	151
Richard Seddon.	28	60	6-1,613	1,966	378		170	718	284	416	38
Surprise.....	29	58	7- 823	2,647	151	303	473	945	473	302	76
Surprise.....	30	58	7- 823	2,849	38	189	340	983	1,021	378	38

\*Sown May 8; when sown May 21, with all other plats, 70 days. \*\*Ready two days earlier. †Would have been better if he

TABLE 2.—DETAILED DATA OF CROP WEIGHTS, NUMBERS AND RELATIONSHIPS OF VINES,

VARIETY	PLAT NO.	TOTAL YIELD PER ACRE	No. VINES PER ACRE	No. PODS PER VINE			No. PEAS PER POD	WEIGHT USABLE PODS
				Good	Poor	Total		
		<i>Tons-lbs.</i>						<i>Lbs.</i>
Horol.....	A	13-1,830	810,700	2.50	0.91	3.41	3.32	12,279
Alaska.....	2	8-1,621	562,650	2.55	0.38	2.93	4.14	8,924
Alaska.....	3	9-1,587	774,400	2.46	0.32	2.78	3.41	10,814
Alaska.....	5A	8-1,318	642,500	2.42	0.32	2.74	3.79	9,387
Alcross.....	1	8- 562	631,600	2.41	0.19	2.60	3.87	8,999
Late Alaska.....	4	9-1,360	701,800	2.32	0.34	2.66	3.34	7,184
Nonpareil.....	5	9- 755	631,600	2.91	0.41	3.32	3.39	10,739
Rogers' Winner.....	6	9- 755	813,000	2.51	0.38	2.89	3.58	9,926
Rogers' Winner.....	6A	8-1,848	853,000	2.61	0.29	2.90	3.36	9,378
Green Admiral.....	7	13-1,225	665,500	2.42	0.58	3.30	3.85	10,257
Green Admiral.....	8	14- 435	732,000	2.71	0.30	3.01	3.49	12,875
White Admiral.....	9	13-1,830	572,300	3.05	1.54	4.59	3.62	10,739
Yellow Admiral.....	10	13-1,830	585,600	3.48	0.79	4.27	3.33	12,440
Advancer.....	11	14-1,645	585,600	3.02	0.61	3.63	4.28	15,703
Advancer.....	12	15- 855	705,400	2.71	0.31	3.02	4.40	15,806
Allan's Canner.....	13	13- 620	465,800	3.00	0.19	3.19	6.21	15,465
Badger.....	14	13-1,225	479,100	3.94	0.82	4.76	4.10	12,554
Canners' Gem.....	15	10-1,780	544,500	2.46	0.38	2.84	3.94	10,569
Canners' Gem†.....	16	11-1,595	497,300	2.94	0.44	3.38	3.53	10,814
Horsford's M. G.....	18	16-1,880	491,200	4.66	0.55	5.21	3.22	15,579
Horsford's M. G.....	19	16- 65	425,900	4.78	0.98	5.76	2.36	11,268
Horsford's M. G.....	5B	14-1,040	386,000	4.27	1.12	5.39	3.90	13,688
Horsford's M. G.....	20	15- 855	399,300	3.91	0.49	4.40	4.50	14,520
Lincoln.....	21	13- 620	**	**	**	**	6.25	10,966
Perfection.....	22	12- 805	532,400	2.24	1.11	3.35	4.24	10,332
Perfection.....	23	12-1,410	425,900	2.75	1.55	4.30	4.72	10,001
Prince of Wales.....	24	12-1,410	319,400	4.78	1.00	5.78	2.55	10,588
Prince of Wales.....	25	12- 200	346,000	**	**	**	**	8,073
Rice's No. 13.....	26	13-1,830	479,200	2.97	1.11	4.08	3.87	11,571
Rice's No. 13.....	27	12- 200	452,500	2.17	0.93	3.10	4.87	9,378
Richard Seddon.....	28	6-1,613	300,100	2.20	0.78	2.98	3.55	5,823
Surprise.....	29	7- 823	496,100	2.74	0.65	3.39	2.84	6,759
Surprise.....	30	7- 823	540,300	2.58	0.47	3.05	2.65	7,147

\*Seeds too thoroly dried for accurate comparisons. †Sampled four days later than Plat 15. \*\*Record of count lost.

## PODS, AND PEAS, AND CLASSIFIED WEIGHTS OF REFUSE FROM STRAINS OF CANNING PEAS.

WEIGHT USABLE PEAS	RATIO PEAS TO PODS	NUMBER OF PEAS PER OUNCE							DRY* SEEDS	WEIGHT OF REFUSE MATERIAL					PLAT NO.
		GRADED								Haulm	Poor pods	Shells	Trash	Total	
		In 16	In 18	In 20	In 22	In 24	In 26	Avg.							
Lbs.	r:									Tons.-lbs.	Lbs.	Tons.-lbs.	Lbs.	Tons.-lbs.	
3,895	3.15	165	130	96	70	63	—	108	198	6-1,400	2,136	4- 167	227	11-1,930	A
3,544	2.21	173	125	91	73	—	—	104	141	4- 149	548	2-1,294	86	7- 77	2
4,065	2.12	176	123	93	76	—	—	100	142	4- 319	454	3- 548	151	7-1,522	3
3,933	2.38	170	126	88	72	—	—	93	142	3-1,505	425	2-1,370	85	6-1,385	5A
3,574	2.52	172	133	97	81	—	—	103	138	3-1,298	265	2-1,293	132	6- 988	1
3,119	2.30	162	121	91	73	—	—	109	167	5-1,853	323	1-1,875	189	8- 240	4
4,177	2.57	170	126	87	71	—	—	93	129	3-1,333	681	3- 277	284	7- 577	5
4,159	2.39	172	126	96	79	—	—	109	180	4- 343	586	2-1,540	227	7- 696	6
4,160	2.25	170	121	96	70	—	—	112	189	4-1,775	397	2-1,992	227	7- 391	6A
4,860	2.11	170	122	84	68	56	46	79	187	8- 220	728	2-1,228	151	11- 361	7
5,444	2.37	170	122	84	68	56	—	79.5	190	7-1,059	501	3-1,341	189	11- 990	8
4,690	2.29	170	122	84	68	56	—	85	188	7-1,777	1,295	2-1,802	246	11-1,120	9
5,105	2.44	170	122	84	68	56	—	83	160	7- 256	1,134	3-1,165	170	11- 725	10
7,109	2.21	164	120	88	65	54	46	66	162	6- 885	1,030	4- 470	151	11- 536	11
8,054	1.96	164	120	88	65	54	46	65	149	7- 406	643	3-1,601	151	11- 801	12
8,508	1.82	165	120	83	67	55	46	64	135	5- 815	340	3- 844	113	9- 112	13
5,597	2.24	165	121	90	71	54	47	86	161	6-1,574	1,097	3- 806	151	10-1,618	14
4,613	2.29	140	87	67	55	44	71.5	118	5- 616	596	2-1,880	76	8-1,168	15	
4,688	2.30	155	87	66	53	45	74	128	5-1,798	983	2-1,993	133	9- 907	16	
7,572	2.06	165	127	85	61	53	49	61	130	8-1,852	718	3-1,941	66	13- 307	18
4,783	2.36	165	121	85	63	52	48	63	135	9-1,530	1,267	3- 428	57	13-1,282	19
6,078	2.25	166	116	85	60	51	45	66	140	6-1,991	1,361	3-1,487	123	11- 962	5B
7,061	2.05	167	114	86	61	50	45	62	133	7-1,664	671	3-1,336	123	11-1,794	20
4,688	2.34	170	131	90	66	54	47	74.5	134	6-1,735	1,919	3- 183	95	10-1,932	21
4,141	2.50	160	127	91	66	54	45	85	152	6- 195	2,278	3- 41	151	10- 665	22
4,102	2.44	173	125	92	69	54	49	84	148	6- 791	2,618	2-1,823	76	10-1,308	23
5,312	1.99	165	120	90	61	53	40	46	105	7- 75	747	2-1,218	57	10- 97	24
4,027	2.00	165	120	90	60	52	37	39	104	7- 766	1,361	1-1,989	57	10- 173	25
4,311	2.69	170	125	90	66	56	50	79	165	7- 595	1,664	3-1,071	189	11-1,579	26
3,782	2.49	175	128	93	66	56	50	79	156	6-1,706	1,115	2-1,445	151	10- 420	27
1,966	3.00	138	86	65	53	43	74	120	3- 665	1,125	1-1,819	38	5-1,647	28	
2,647	2.55	215	175	100	70	57	52	91	156	3-1,459	605	2- 36	76	6- 176	29
2,849	2.16	215	175	100	70	57	53	75	137	3- 957	719	2- 160	38	5-1,874	30

and general canning quality, the seeds indicate the use of a wrinkled pea in its breeding, being intermediate between the pitted and dented forms of the best Alaskas, and the wrinkled Admirals. A few of them are distinctly, tho rather coarsely, ridged or wrinkled, but the great majority are very deeply pitted or dented. The color of the peas, both dry and green, is about like that of Alaska; but they are very much smaller, the dry peas running about 200 to the ounce and the green ones about 135. The two strains tested, however, were somewhat unlike in size of seed, one producing vines at the rate of 813,000 to the acre, the other 853,000; while the former gave 33 per cent of No. 1 and No. 2 peas and the latter 44 per cent. The two strains were practically identical in number of pods per vine (2.89 and 2.90), but the pods of the former contained about 7 per cent more peas which were 3 per cent larger than those of the second strain. The increased size of the peas, with the larger proportion in cheaper grades in the first strain, made the second the more profitable to grow for a grading cannery, altho the total yields of the two strains were equal.

#### ADMIRALS

*Green Admiral*.—A wrinkled pea probably obtained by selection from the old Admiral, with darker green, somewhat shorter vines than either the parent type or the cream-colored canning strain developed from it, and with smaller, light to medium green seeds, rather more wrinkled and of somewhat better quality as well as better color when canned, than the Yellow or White Admiral. The long, slender vines and heavy foliage of the Admirals make them quite susceptible to root rot, but none was discovered in this test. The variety seems quite well fixed, yet strains from different sources show decided differences in yield due to the larger number of vines to the acre from the small-seeded strain, with consequent smaller pods, more evenly matured, and fewer peas in the pod. Planted with Alaska, the pods were two weeks later in reaching the canning stage. Tho wrinkled peas and of much better quality than Alaska, they are usually graded the same and the 1's and 2's sold for the same price; but the 3's and 4's, in which the peas principally fall, are valued at three-fourths and one-half cent more a pound than the Alaskas.

*White Admiral*.—For canning purposes, identical with Yellow Admiral from which it is indistinguishable in either dry or green seed; but in earlier stages of growth the vines are lighter in color and are slightly taller or more erect, but these differences lessen as harvest approaches.

*Yellow Admiral*.—A cream-seeded, wrinkled pea, with decidedly larger seeds, both green and dry, than Green Admiral; and with lighter colored, slightly more erect vines. The differences between this and White Admiral, except during the early stages of vine growth, are less than between the two strains of Green Admiral from

the same sources. In number of pods per vine and number of peas per pod the White Admiral is better; the pods are smaller and thinner walled, making less refuse, but they do not ripen as evenly. The quantity of usable peas is less when the crops are harvested at apparently the same stage. In all ways that count for production and profit the cream-seeded Admirals appear inferior to the green-seeded strains.

*Horal*.—A new canning pea developed by the Wisconsin Agricultural Experiment Station experts is in many respects comparable with Green Admiral, tho differing in vine characters. The vines are short, slightly stocky, with few or no branches, and very dark green foliage. The fine seeds, running about 200 to the ounce, give a large number of vines to the acre, tho not quite as many as does Rogers' Winner. The vines are short, not over  $1\frac{1}{4}$  to  $1\frac{1}{2}$  feet in height, heavily podded from base to tip, but short enough and supporting each other well enough to permit easy harvesting with the cutter bar run low. Sown May 8, two weeks before Alaska, owing to unfortunate weather conditions which prevented earlier sowing and stopped any seeding for the fortnight, *Horal* was ready for cutting a week later than Alaska, making an apparent difference of three weeks in maturing; but a small plat sown at the same time as Alaska was ready two weeks later. The early sowing proved the extreme hardiness of *Horal*; as rain fell almost daily during the two weeks before Alaska was sown, several of the storms being so heavy that portions of the test plat were under water for from two to four days at two different times; and weather was abnormally cold for the season, with an average minimum temperature of  $44^{\circ}$  and an average mean of  $53^{\circ}$ . Notwithstanding these most unfavorable conditions, under which nearly all wrinkled-seeded peas would have rotted, apparently every seed of *Horal* germinated, tho slowly, even where under water for days. Evidently, *Horal* inherits the hardiness and small-seeded character of one parent, Alaska, with the fine vine color and wrinkled seeds of the other, Horsford's Market Garden; but unfortunately lacks much of the fine quality and sweetness which usually accompany such wrinkling. *Horal* is, however, a much better canning pea than Alaska, better in color, flavor, and texture, and even the smallest peas are firm so there is no danger of turbid juice. The yield of vines is greater than that of Alaska, the total number of pods to the vine much greater, but the number of peas to the pod much less; and in this year's test, at least, the percentage of unusable pods was large; so that the weight of usable peas was about the same as that of two of the Alaska strains, in spite of the larger yield of vines and pods. In grading the peas, however, where Alaska strains give one-fifth to one-third 1's and 2's, *Horal* gives more than 60 per cent of these desirable and high-value grades. It seems to be unequalled by any pea in fitness for production of "June Sifted" and "Petit Pois" brands, tho in quality not equal to Rice's No. 13.



Just how well it harmonizes in time with the other peas used in New York canneries must be determined by further tests; since the abnormal conditions of 1924 make it impossible to specify proper time for sowing, length of growth period, and time of harvesting.

#### SWEET, WRINKLED PEAS

*Advancer*.—With growers this is probably the favorite canning pea. Large vines, large, well-filled pods, large peas, and good yields make it, where sold on bulk weight basis, one of the most profitable peas to grow. For the canner, however, the percentage of large peas is too great, more than 80 per cent of the weight of the peas going to 4's and 5's. While a wrinkled pea, it is not of the highest quality and is rather apt to run too light in color, especially when cut rather late, as growers are often tempted to cut it because of the rapid increase in yield as the pods approach maturity. The percentage of usable pods at cutting time is as good or better than in Alaskas; the vines give about three good pods each and the pods show about  $4\frac{1}{3}$  peas to the pod which run about 65 to the ounce. The seeds are of a peculiar light grayish green color with a few cream-colored ones, averaging about 130 to the ounce. There are slight differences in strains, again due quite largely to the increased number of vines to the acre from the small seed of one strain. The difference between the strains is of more financial effect where peas are sold ungraded, almost disappearing where computations are made by grades.

*Allan's Canner*.—A comparatively new pea. The crop is ready about with the Admirals, possibly a day or so later, or a day or so earlier than *Advancer*; seeds rather larger than *Advancer*, mainly yellowish cream in color but with a slight admixture of light green seeds, all well wrinkled. Vines under 2 feet, foliage darker than *Advancer*, usable pods three to the vine, with very small percentage not usable, long and curved, averaging more than six peas. The yield is considerably better than that of *Advancer* but the peas are larger; so the variety would give about the same return as *Advancer* when graded, but slightly better when sold in bulk.

*Badger*.—Another very promising Wisconsin Station variety, a double "hybrid," one parent being a selected Horsford strain and the other from a cross between Horsford and French June, a small-seeded, early Canadian Field pea. In our tests of 1924 *Badger* showed the greatest returns of any variety, because 15 per cent of the green peas passed the 20/64 inch sieve and 39 per cent more the 22/64 inch. Tho not quite so good in color as *Advancer*, it seemed fully as good, if not better, in quality. The dry seeds are more finely wrinkled, making them lighter in weight, tho apparently larger than *Advancer*, so that fewer vines were produced from the same rate of seeding. The vines are very similar to those of *Allan's Canner*; but produced more pods to the vine. The percentage of unusable pods (20) was somewhat high. The yield was comparatively small, making it a

poor pea to sell ungraded, but a very profitable one where small peas bring high prices. Badger is said to be slightly less resistant to root-rot than other varieties developed in Wisconsin; but this disease was not observed in any of the test plats in 1924, except those of Prince of Wales. Badger vines were exceptionally well colored, strong, vigorous, and healthy.

*Canners' Gem*.—A small-vined variety with dark green foliage of about same shade as Yellow Admiral, but lighter on under side of leaflets. The two strains tested showed decided differences, comparatively slight in general appearance, but most marked as regards time of maturity, it being necessary to wait four days after the first strain was cut before the second was ready. This tardiness was manifest at blooming time and accompanied a slightly taller vine and lighter colored foliage. The earlier strain was ready six days after Alaska, and the other ten days after, making the variety intermediate in ripening between the smooth-seeded peas and the Admirals. The seeds are much like those of Advancer but distinctly larger, rather better green, and slightly more wrinkled; while the canned peas are of better quality. Disregarding the first cutting of the late maturing strain and using the sample cut four days later, the yields, grades, and financial returns from the two strains are about alike; but the crops from the two strains, if both were grown for one factory, could hardly have been handled together.

*Horsford's Market Garden*.—An old favorite for the truck farmer as well as for the grower of canning peas, and probably next to Alaska, the best-known pea of American origin. As previous experience had indicated wide variations between Horsford strains, samples of seed were secured from four different sources, the results showing financial advantage for one strain over another of 50 per cent when returns were calculated on a grade basis, or of 58 per cent when the crops were priced in bulk. The poorer strain was the same in each case, but the best variety by graded crop prices was not best in bulk price returns. The strain differences<sup>1</sup> included variations in size, color, and degree of wrinkling of seed; in numbers of vines per acre; in numbers of pods per vine and of percentages usable at cutting time; in numbers of peas per pod; in total yields; and in distribution of peas in grades. Horsford's produces more vines than any other canning pea, and more hulls than any except Horal and Advancer, so returns large amounts of refuse to the soil, either directly or after feeding as silage. The seeds are large, light to medium green in color with a mingling of cream; often compressed or flattened, and well wrinkled; and the green peas are of good color and fair to good in

<sup>1</sup>It should be noted that some of these striking differences in Horsford strains are due to the fact that one strain (Plat 20) is a pedigreed one from the Wisconsin Station, selected and developed for rather different characters than those shown by other strains. But the strain on Plat 19 differs noticeably from the other two.

quality, but, like Advancer, fall too largely in the cheaper grades. The calculations from the Station 1924 tests show Horsford's to be rather less profitable to grow than Advancer when sold either by grades or in bulk. It was slightly later in maturing than Advancer.

*Lincoln*.—Not known as a canning pea, but seemed in previous tests to show promise along this line, so was tried. The vines are quite similar in color and general appearance to those of Horal, but somewhat taller and rather less "stocky." Since the vine count was lost, it is impossible to say whether the yield was reduced by poor germination. From general appearance of the vines, the weight of a full crop should have been about equal to that of Horal, but was considerably less. From the results obtained it was inferior to Advancer and Horsford's as a producer of ungraded peas, and of much less value than Allan's Canner, Badger, or Perfection for a graded product; but was unsurpassed in quality by any pea grown except Richard Seddon. In garden tests of previous years the yield has been checked as "very good." The long, slender pods averaged  $6\frac{1}{4}$  peas apiece. It demands further trial.

*Perfection*.—A favorite grading pea in some sections, but not much grown in New York. It has a short, erect vine of moderate length, between Alaska and the Admirals in color, ready to cut 10 or 12 days later than Alaska, but before any other mid-season wrinkled pea unless it be a late strain of Cannery's Gem. This "in-between" season is sometimes a disadvantage, since it prevents combination with other varieties when crop shortage makes it impossible for one variety to keep the viners and cannery working. The seeds are slightly smaller than those of Cannery's Gem, light bluish green in color, with some cream, and are much wrinkled. Peas of fairly good color, grade nearly as well as Badger, and better than Cannery's Gem or Rice's No. 13. A defect this season was lack of uniformity in ripening, as the crop had to be cut when one-third of the pods were not ready to shell. In spite of its disadvantages, it would be one of the most profitable varieties to grow for a grading cannery; the two strains, which differed considerably, showing as good or better returns graded than any wrinkled variety but Badger.

*Prince of Wales*.—The variety commonly used for the large, sweet, wrinkled, canned peas corresponding to the "Telephones" among green peas. The seeds are so large that only a few vines are obtained to the acre without double seeding. This makes the yields comparatively small when sown at the same rate as small peas. The two plats grown in 1924 were also seriously affected with leaf-spot and considerably with root-rot; so that the results were disappointing. The vines are tall, straggling, often difficult to cut, and medium to light green. The very high percentages of small-value grades, with comparatively low yields, made calculated financial returns exceedingly poor on the graded basis and low on the total

weight basis. The two strains showed marked differences in many respects, but conditions make it inadvisable to stress these since more than 90 per cent of each were placed in grades 4 and 5. One strain, however, was of distinctly better color than the other. The seeds of the second strain were deep yellowish cream, while almost all seeds of the first showed a greenish shade and some were entirely light green. The quality is only fair.

*Rice's No. 13.*—About 1912, Sutton & Co., English seed dealers and pea breeders, began distribution of an "Improved Petit Pois" pea, without giving its parentage. Seed of this pea was included by the Jerome B. Rice Seed Co., in its trials, as No. 13. The trial proving the variety a promising one, additional stock was secured, from which, by strain selection, the present Rice's No. 13 has been developed. Latest to mature of the canning peas tested, it has medium sized, well-wrinkled seeds, rather mixed in color of seed coat, from light cream (very few) thru light bluish gray and greenish blue to medium or even dark green (very few). The vines are  $2\frac{1}{2}$  to 3 feet, trailing, but with rather stout stems that hold them up fairly well; foliage dark green. The two strains, neither from the American introducer, differ markedly in number of pods per vine and number of peas per pod, these differences, however, tending to neutralize each other, but unitedly resulting in an increased yield of one-sixth for one strain with an accompanying increase of one-eighth in the proportion of peas falling in the better grades.

*Richard Seddon.*—A variety originating in New Zealand, introduced into western Canada, and distributed eastward thruout the Provinces, where it has become a marked favorite, at least as a garden and truck crop pea, because of its small, very dark green vines, deep green pods and peas, and splendid quality. The seeds are of about the same color as Rice's No. 13. Those secured for the test, from a seed dealer, not grower, proved to be of poor germinating quality so that only 300,000 vines to the acre were produced, instead of one-half or two-thirds more as should be the number to give a good crop. The vines produced about three pods, and the pods averaged  $3\frac{1}{2}$  peas, of which 27 per cent were 2's and 3's, 37 per cent 4's, and 36 per cent 5's. In processing, the peas retain their fine green color, being darker than any other pea put up at the Geneva Preserving Company's cannery, of the very finest quality, and with a rather distinct flavor. The pea is well worth testing again, altho giving the poorest yield and lowest financial returns of any.

*Surprise.*—A variety introduced by J. J. H. Gregory, the "surprise" consisting in the appearance of a very early, finely wrinkled, splendid quality pea on a vine of the Alaska type. A similar pea originated at practically the same time in breeding experiments of Prof. Goff at this Station, which was distributed as "Station." Surprise and Station have been held by many to be identical; indis-

putable evidence proves the origins entirely unconnected and the parents unlike, one of the anomalies of breeding. Sown at the same time as Alaska in our tests of 1924, a condition made necessary by the wet spring, Surprise was ready only two days later; but in ordinary seasons would be sown after the smooth-seeded variety, as rather less hardy, yet would be harvested at very nearly the same time. The seeds of Surprise are small, 160 to 180 to the ounce, bluish green and light green in color with occasional ones cream-coated; and the vines are much like those of Alaska, but more slender and with scantier foliage, bearing rather more pods to the vine but distinctly fewer peas to the pod, so that the yield was less than two-thirds that of the better strains of Alaska. As a wrinkled pea, Surprise brings a better price than Alaska, but in our tests was not as profitable by total weight at one-sixth higher price, or by grade. Again, marked differences were shown by two strains in color and height of vine, total yield (comparatively slight), and grade. The better grading of the poorer-producing strain made it decidedly the better of the two at graded prices. Lack of hardiness and poor yields count heavily against Surprise.

## GENERAL NOTES AND CONCLUSIONS

In these plat tests of 1924, marked differences appeared in the crops of the same variety of peas, grown under the same conditions from seed secured from different growers. The extent of these "strain" variations will be revealed in full only by careful study of the data given in the tables; but their nature and amount have been indicated in the foregoing discussions of the varieties.

Attention will here be called to only a few of them to show that, in many respects, strain differences are fully as important to the grower of canning peas and to the canners as are varietal differences.

For example, between the average yield of the two better strains of Alaska peas (Plats 3 and 5A) and of the two strains of Rogers' Winner, the difference in weight of usable peas is only 160 pounds to the acre; but between the average of these two Alaskas and a third strain (Plat 2), all from seed secured from reputable and widely known growers, the difference is 460 pounds, nearly three times as much. The averages of two strains of Advancer (Plats 11 and 12) and of two strains of Horsford's Market Garden (Plats 18 and 20) differ by 280 pounds; while the two strains of Advancer are 945 pounds apart and the two of Horsford's 510 pounds.<sup>2</sup>

The heaviest yielding and poorest yielding of the four strains of Horsford's show a difference of 2,850 pounds.

<sup>2</sup>See footnote 1, page 14.

Again, one strain of Cannery's Gem (Plat 16) and one of Perfection (Plat 22), two varieties quite similar in general characteristics and sometimes united in canning if crop shortage or other causes make such combination advisable, were ready for use on the same date; but the other two strains of these varieties (Plats 15 and 23) were five or six days apart in reaching canning condition and could not have been canned together. One strain of Cannery's Gem (Plat 15) was at least four days ahead of the other strain (Plat 16).

In grading, Nonpareil (Plat 5) gave 20 per cent of its yield of 4,177 pounds as 1's and 2's, and 80 per cent as 3's and 4's; and one strain of Alaskas (Plat 5A) 21 per cent and 79 per cent, respectively, of its 3,933 pounds of peas in these grades; but Alaskas on Plat 3 showed 27 per cent and 73 per cent of 4,065 pounds of peas in corresponding grades. That is, Nonpareil and one Alaska yielded and graded approximately the same; but another Alaska, tho yielding about the same, gave 6 per cent more small peas. A third Alaska (Plat 2) produced about 500 pounds less peas than that on Plat 3, and would have sold ungraded for \$15.50 less; but the peas of the former strain graded so much better that they would have brought \$14 more than the other,<sup>3</sup> if sold by grade.

In number of vines per acre, the four Horsford<sup>3</sup> strains ranged from 386,000 to 491,000, with a difference in total weight of almost a ton and a half; in number of pods per vine from 4.40 to 5.76, in percentage of pods available at cutting time from 79 per cent to 89.5 per cent, and in number of peas per pod from 2.36 to 4.50. These marked variations have great effect upon the gross weight value of the crop, the return from the peas of one strain on that basis being \$83 more than from another, but on the graded basis the difference between the best and the poorest strains is \$64.

*Between varieties*, the greatest range in the number of pods per vine is between Alcross (Plat 1) with 2.60, and Prince of Wales (Plat 24) with 5.78; in proportion of usable pods, between Perfection (Plat 23) with only 64 per cent of the pods ready when some of the peas were hardening, and Allan's Canner (Plat 13) with 94 per cent; in number of peas per pod, between Horsford's (Plat 19), 2.36, and Lincoln, 6.25; and in ratio of peas to pods, between Badger, 1:3.15, and Allan's Canner, 1:1.82. For the same factors, the ranges *within varieties*, are: Number of pods per vine, greatest range in Horsford's

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<sup>3</sup>See footnote 1, page 14.

Market Garden between Plat 19, 5.76, and Plat 20, 4.40; least range between two strains of Rogers' Winner, 2.89 and 2.90; in proportion of pods usable, greatest range in Green Admiral 73.4 per cent and 90 per cent; least in Cannners' Gem, 86.6 per cent and 86.9 per cent (harvested four days apart) or in Alaska 87 per cent and 88.5 per cent; in number of peas per pod, greatest range in Horsford's<sup>4</sup> (Plats 19 and 20) 2.36 and 4.50, least range in Advancer 4.28 and 4.40; in ratio of peas to pods, greatest range in Surprise 1:2.16 to 1:1.55 and least range in Cannners' Gem 1:2.29 and 1:2.30.

Since the figures are at hand, it may be of interest to compare the returns that would have been received from these 33 varieties or strains of peas if sold on grade basis or on a bulk basis. The comparisons are made in Table 1 for the separate plats and show decided differences; but averaging the returns by the two contract methods and scales of prices commonly used in New York, we find that, taking all the varieties and all the strains, payment by grade would give the grower a 10.2 per cent gain. However, Horal and Badger are not grown at all in this State, and Cannners' Gem and Perfection only in a few localities, so that none of these typical producers of small size peas affect general prices. Excluding them, the average returns by the two methods differ by slightly more than 0.4 per cent. It is evident that the grower cutting crops of several different varieties would get approximately the same returns under either method of payment, at present prices.

#### NEW CANNING PEAS

Of the new peas tested, Horal and Badger both show great promise for this State, and should be tested on a commercial scale so their value can be definitely determined. Lincoln and Richard Seddon are peas of splendid canning quality, but must be further tested for productivity in a normal season before growth on a commercial scale can be recommended.

Several other peas when grown in short rows, have shown some adaptability for canning, notably Duke's Delight, Chelsea Gem, Witham Wonder, Mighty Atom, and Little Marvel, as have other varieties listed by seedsmen in England, France, and the Netherlands; and other tests should include some or all of these kinds.

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<sup>4</sup>See footnote 1, page 14.

## PRACTICAL SUGGESTIONS

The variations found between crops of the same variety of canning peas, grown under uniform conditions, from seed secured from different seed-pea growers—what we have called “strains”—extend to practically every character that canners consider when selecting varieties. In many cases, as wide or wider variations in factors that make for profit or loss for canner or grower have been found between strains as between varieties of similar general character.

It seems evident that, for their own best interests and the welfare of their contracting growers, those responsible for the selection of seed peas to be sown over large areas should have careful preliminary tests made of the strains existing in practically all well-known varieties of canning peas.