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LINT PERCENTAGE AND LINT INDEX OF COTTON AND METHODS OF DETERMINATION.

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CONTENTS.

	Page.		Page.
Relation of lint percentages to lint indexes	1	Improved methods for obtaining lint percentages	8
Lint percentages	2	Advantages of using samples of standard weight	10
Lint indexes	2	Methods of calculating lint indexes and seed weights	10
Illustrations of the relation between lint percentage and lint index	3	Number of seeds in a standard sample an indication of their size	10
Lint index determines the number of bolls to the pound of fiber	5	Planters can estimate the lint index	11
Relation of the lint index to the cost of picking	5	Summary	11
Increasing the lint percentage does not alter the cost of production if the lint index remains constant	8		

RELATION OF LINT PERCENTAGES TO LINT INDEXES.

The danger of reducing the vitality and earliness of cotton varieties and of breeding varieties with undesirable characters by overemphasizing the percentage of lint as a measure of their comparative values was pointed out in 1908 by Mr. O. F. Cook.[1] It was suggested that the weight of the lint or fiber ginned from 100 seeds, instead of the lint percentage alone, be used as an additional standard for judging varieties. This standard of comparison was called the lint index. Subsequent experience has not only demonstrated the desirability of using this standard, but has led to the development of improved methods and devices for determining both the lint index and the lint percentage in experimental samples of seed cotton with which breeders have to work.

[1] Cook, O. F. Danger in judging cotton varieties by lint percentages. U. S. Dept. Agr., Bur. Plant Indus. Cir. 11, 16 p. 1908.

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That a clearer understanding may be had of the relations between lint percentages and lint indexes in cotton varieties, as discussed in this paper, a brief definition of each is included, together with a word as to the adoption of these measures of cotton values.

LINT PERCENTAGES.

The percentage of lint, or lint per cent, as it is generally termed, is the relation between the weight of the fiber and the weight of the seeds from which the fiber is obtained in the process of ginning and is expressed as a percentage of the unginned seed cotton. A decrease in the weight of the seeds without a corresponding decrease in the weight of the fiber would alter this relation in the direction of increasing the percentage of lint. Conversely, an increase in the weight of the seeds without change in the weight of the fiber would result in a reduction in the percentage of lint.

The first commercial use of the percentage of lint was made by early operators of gins, who purchased cotton in the seed, ginned it, and resold the products. In those days, when the seed was considered a waste product, it was of especial importance to these gin operators to know the ultimate value of the seed cotton they purchased. The amount of fiber they might secure from a given weight of seed cotton, or the lint percentage, was the basis of such purchases. The emphasis laid upon the percentage of lint by these buyers of seed cotton naturally led to the belief among the growers that it was the chief factor or measure of value of varieties. To-day this relic of an admittedly bad method of selling cotton[1] is still accepted without question or apparent examination by planters and also by many of the breeders of cotton. The result is that inferior and unproductive varieties frequently have been planted merely because their lint percentages are high, while varieties that are superior both in productiveness and in quality of fiber have been rejected because their percentages of lint are considered low.

LINT INDEXES.

The lint index is the weight in grams of the fiber produced by 100 seeds and may be said to be a measure of the abundance of the fiber rather than a measure of the relation between the weight of the fiber and the weight of the seed, as is the percentage of lint.

Through years of association, the general cotton-growing public has come to consider a lint percentage of 33⅓ a basis of credit for a variety of cotton. So, in time, breeders may determine a basic lint

[1] Creswell, C. F. Disadvantages of selling cotton in the seed. U. S. Dept. Agr. Bul. 375, 18 p. 1916.

——— Losses from selling cotton in the seed. U. S. Dept. Agr., Farmers' Bul. 775, 8 p. 1916.

index, a departure from which will be considered an indication of either merit or demerit for a variety. The better varieties of Upland long-staple cottons have been found thus far to have a lint index of 5 to 6, and the better varieties of Upland short staples a lint index of 7 to 8. Varieties have been examined which were found to have a lint index as low as 4, and one variety was seen with a lint index of 9.50.

In order to facilitate the finding of lint indexes Table I has been prepared, in which the lint indexes, corresponding with various weights of seed and percentages of lint, are given. This table probably covers the range of commercial varieties. In using it the percentage of lint and the weight of 100 seeds of the variety or selection are first ascertained; then the lint index may be found in the column under the lint percentage, opposite the weight of the seeds. For example, a variety in which the seeds weigh 12 grams per hundred and which gins 35 per cent of lint will have a lint index of 6.46; that is, the lint ginned from 100 seeds will weigh 6.46 grams.

TABLE I.—*Lint index of a sample of cotton when the weight of 100 seeds and the percentage of lint are known.*

[Formula: Weight of seed ÷ percentage of seed × percentage of lint = lint index.]

Weight of 100 ginned seeds.	Percentage of lint.																	
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	Index.	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*	*Index.*
6.0 grams	2.00	2.10	2.24	2.33	2.45	2.57	2.69	2.82	2.95	3.09	3.23	3.37	3.52	3.68	3.83	4.00	4.16	4.34
6.5 grams	2.16	2.28	2.40	2.53	2.65	2.78	2.92	3.06	3.20	3.35	3.50	3.65	3.81	3.98	4.15	4.33	4.51	4.71
7.0 grams	2.33	2.46	2.59	2.72	2.86	3.00	3.14	3.29	3.45	3.61	3.77	3.94	4.11	4.29	4.47	4.67	4.86	5.07
7.5 grams	2.50	2.63	2.77	2.92	3.06	3.21	3.36	3.53	3.69	3.86	4.02	4.21	4.40	4.60	4.80	5.00	5.20	5.44
8.0 grams	2.66	2.81	2.96	3.11	3.27	3.43	3.59	3.76	3.94	4.12	4.31	4.50	4.69	4.91	5.11	5.33	5.56	5.80
8.5 grams	2.83	2.98	3.14	3.30	3.47	3.64	3.82	4.00	4.19	4.38	4.58	4.78	4.99	5.21	5.44	5.67	5.91	6.15
9.0 grams	3.00	3.16	3.32	3.50	3.67	3.85	4.04	4.23	4.43	4.63	4.85	5.06	5.28	5.52	5.75	6.00	6.25	6.52
9.5 grams	3.16	3.33	3.51	3.69	3.88	4.07	4.27	4.47	4.68	4.90	5.11	5.34	5.58	5.82	6.08	6.34	6.60	6.88
10.0 grams	3.33	3.51	3.69	3.89	4.08	4.28	4.49	4.71	4.92	5.15	5.39	5.62	5.87	6.13	6.39	6.67	6.95	7.24
10.5 grams	3.50	3.69	3.88	4.08	4.28	4.50	4.71	4.94	5.18	5.41	5.65	5.91	6.17	6.43	6.71	7.00	7.30	7.60
11.0 grams	3.67	3.86	4.07	4.28	4.49	4.71	4.95	5.18	5.42	5.67	5.93	6.18	6.45	6.75	7.03	7.35	7.65	7.98
11.5 grams	3.83	4.02	4.25	4.47	4.69	4.93	5.17	5.41	5.67	5.92	6.19	6.48	6.76	7.05	7.36	7.68	8.00	8.33
12.0 grams	4.00	4.21	4.43	4.67	4.90	5.14	5.38	5.64	5.91	6.17	6.46	6.75	7.05	7.35	7.67	8.00	8.34	8.68
12.5 grams	4.16	4.39	4.62	4.86	5.11	5.36	5.62	5.88	6.16	6.43	6.74	7.03	7.33	7.67	8.00	8.34	8.68	9.05
13.0 grams	4.33	4.58	4.81	5.05	5.30	5.57	5.84	6.11	6.41	6.71	7.00	7.30	7.63	7.97	8.35	8.66	9.04	9.40
13.5 grams	4.50	4.74	5.00	5.23	5.51	5.77	6.07	6.35	6.65	6.95	7.26	7.59	7.93	8.27	8.62	9.00	9.37	9.77
14.0 grams	4.68	4.91	5.17	5.45	5.71	6.00	6.29	6.58	6.89	7.21	7.54	7.88	8.22	8.58	8.94	9.35	9.73	10.01
14.5 grams	4.83	5.10	5.36	5.53	5.92	6.21	6.51	6.82	7.13	7.47	7.80	8.15	8.52	8.89	9.26	9.65	10.06	10.50
15.0 grams	5.00	5.27	5.55	5.83	6.12	6.43	6.74	7.06	7.38	7.72	8.06	8.43	8.81	9.19	9.58	10.00	10.16	10.33
15.5 grams	5.17	5.45	5.73	6.03	6.33	6.54	6.97	7.29	7.63	7.97	8.35	8.72	9.10	9.50	9.90	10.33	10.76	11.22
16.0 grams	5.33	5.62	5.92	6.22	6.53	6.86	7.19	7.52	7.88	8.24	8.61	9.00	9.38	9.81	10.22	10.66	11.11	11.57

ILLUSTRATIONS OF THE RELATION BETWEEN LINT PERCENTAGE AND LINT INDEX.

A few examples of possible combinations of characters that may be found in varieties, as shown in Table I, are here given to illustrate the relation between lint percentage and lint index.

The lint index given for a seed weight of 13 + 25 per cent is practically identical with that given for a seed weight of 6 + 42 per cent. In each case practically the same quantity of fiber is obtainable from a given number of seeds, although one variety has a lint percentage of 25 and the other 42. Thus it is seen that the larger percentage of lint is due entirely to a decrease in the weight of the seeds without change in the amount of fiber per seed, a striking illustration of the fallacy of basing an opinion as to the value of a variety of cotton on the percentage of lint alone.

A high percentage of lint, therefore, does not necessarily mean an abundance of fiber. The fiber is actually less abundant when there is 42 per cent of lint in a variety the seeds of which weigh 8 grams per hundred than when there is 30 per cent of lint in a variety the seeds of which weigh 14 grams per hundred.

That the percentage of lint will steadily increase as the size of the seed decreases without altering materially the actual amount of fiber obtainable may be seen if the lint index under a seed weight of 13 + 25 per cent be taken as a base. Approximately the same lint index may be traced diagonally across the table to the lint index under a seed weight of 6 + 42 per cent. It can readily be appreciated that this trend represents the possible results of selection based on lint percentages alone.

Conversely, an increase in the weight of the seed may reduce the percentage of lint without reducing the actual amount of lint; but unless the reduction in the percentage of lint is proportionate with the increase in the size of the seed the abundance of the lint is also increased, notwithstanding the reduction of the lint percentage.

This is in accord with the results obtained by Mr. T. H. Kearney in his work in the acclimatization of Egyptian cotton,[1] in which he noted that the lint percentages of his best selections were steadily decreasing from year to year below that of the original imported strain, but on ascertaining the lint indexes of the selections and imported stock he found that there was no actual diminution in the quantity of fiber produced. The decrease in the lint percentage was due entirely to an increase in the weight of the seeds. Mr. Kearney concludes:

> The negative correlation between the characters lint percentage and weight of seeds is sufficiently pronounced to indicate that a high percentage of lint is in large measure associated with low weight of seeds. * * * It might be inferred from these facts that lint percentage can be used with greater safety as an index of productiveness in comparing individual plants of a fairly uniform variety than in comparing different varieties.

That the percentage of lint of a selection or variety of cotton should be considered only in the light of the lint index is well illus-

[1] Kearney, T. H. Lint index and lint percentage in cotton breeding. *In* Ann. Rpt. Amer. Breeders' Assn., v. 7/8, p. 25–29. 1912.

trated by comparing the lint indexes given with a seed weight of 8.5 under lint percentages 32 and 42. An increase of 10 in the lint percentage here results in an increase in the lint index or actual quantity of fiber of 4 to 6.15. Practically the same increase in the abundance of fiber would be obtained by increasing the weight of the seeds from 8.5 to 13 grams per hundred, while the percentage of lint remained at 32, or the same result might be secured if the weight of the seeds be increased from 8.5 to 11 grams per hundred and at the same time the percentage of lint be also increased from 32 to 36.

LINT INDEX DETERMINES THE NUMBER OF BOLLS TO THE POUND OF FIBER.

The average Upland cotton boll usually contains eight or nine seeds per lock. Five-locked bolls will therefore contain 40 to 45 seeds per boll. The number of seeds yielding 1 pound of fiber may be found, after the lint index is known, by dividing the number of grams in 1 pound by the weight of the fiber on one seed, or one one-hundredth of the lint index. Roughly, 453 grams equal 1 pound. Therefore, all varieties of cotton that have a lint index of 4 will require 11,235 seeds to produce a pound of fiber. The number of seeds per pound of fiber is constant for every lint index, as indicated by the following formula:

$$453 \div \frac{\text{lint index}}{.100} = \text{number of seeds producing 1 pound of fiber.}$$

The lint index, therefore, determines the number of bolls to the pound of fiber.

The number of seeds and of bolls to the pound of fiber computed for different lint indexes is given in Table II.

That the differences in the lint indexes are coincident with the variation in the size of the seeds is shown by the weights of the seeds per hundred as given in the last column, the weights in this case being based on a percentage of lint of 33.

RELATION OF THE LINT INDEX TO THE COST OF PICKING.

The number of seeds that must be harvested so that a pound of fiber may be secured is an item of considerable importance in the cost of picking cotton. An indication of the possible reduction in the cost of harvesting resulting from an increase in the lint index may be had from the following examples, taken from Table II.

If the weight of the seeds be increased from 8.5 to 11.3 grams per hundred with a constant lint percentage of 33, the lint index will have been increased from 4.20 to 5.60, an increase of 1.40 grams of fiber per hundred seeds, or 33⅓ per cent. This increase in the amount of fiber will have been secured without changing the percentage of lint, and results in reducing the number of seeds required to produce 1

pound of fiber from 10,785 to 8,089. This reduction of 2,696 seeds is equal to 67 bolls of 40 seeds each, or 60 bolls of 45 seeds each, or an average of 64 bolls, which means a saving of 25 per cent in the number of bolls to be picked.

TABLE II.—*Relation of the lint index to the number of seeds and of 5-locked bolls required to produce 1 pound of cotton fiber.*

Lint index.	Required to produce 1 pound of fiber.				Average difference in number of bolls for each 10 points in lint index.	Weight of 100 seeds, the lint percentage being 33.
	Number of seeds.	Number of bolls.				
		Bolls of 40 seeds.	Bolls of 45 seeds.	Average.		
						Grams.
4.0	11,325	283	251	267		8.1
4.2	10,785	269	239	254		8.5
4.4	10,295	257	228	242	54	8.9
4.6	9,847	246	218	232		9.3
4.8	9,437	235	209	222		9.7
5.0	9,060	226	201	213		10.1
5.2	8,711	217	193	205		10.5
5.4	8,388	209	186	197		10.9
5.6	8,089	202	179	190	36	11.3
5.8	7,810	195	173	184		11.8
6.0	7,550	188	167	177		12.2
6.2	7,306	182	162	172		12.6
6.4	7,078	176	157	166		13.0
6.6	6,864	171	152	161	25	13.4
6.8	6,661	166	148	157		13.8
7.0	6,472	161	143	152		14.2
7.2	6,291	157	139	148		14.6
7.4	6,121	153	136	144		15.0
7.6	5,960	149	132	140	19	15.4
7.8	5,807	145	129	137		15.8
8.0	5,662	141	125	133		16.2
Total reductions due to an increase of 4 grams in weight of 100 seeds...	5,653	142	126	134	.....	.....

Increasing the lint index from 4 to 5 reduces the number of seeds to be harvested to secure 1 pound of cotton fiber from 11,325 to 9,060, or from 267 bolls to 213 bolls. Expressed in terms of bolls to be picked, this is an average reduction of 54 bolls per pound of fiber. In other words, a variety with a lint index of 4 will run 25.3 per cent more bolls to the pound of fiber than a variety with a lint index of 5. In terms of labor employed, this means that if two men are picking at the same rate or number of bolls per hour, the one picking in a variety having a lint index of 5 will gather the same quantity of fiber in 8 hours that the other, working in a variety with a lint index of 4, will gather in 10 hours.

If a variety having a lint index of 6 be compared with one having a lint index of 4, it will be seen that 90 bolls more, or 50.8 per cent, must be gathered in the smaller seeded variety than in the larger seeded in order to secure a pound of fiber. In the one case the laborer must pick 88,500 bolls, while in the other he must gather some 133,500 bolls to get a bale of lint cotton. We have seen from Table I that the same

lint index may be found in varieties differing greatly in their percentages of lint; in other words, that the lint index is a measure of the abundance of the lint independent of the percentage of lint. Therefore, the number of bolls necessary to be picked to yield a bale of lint remains constant for each lint index regardless of the percentage of lint.

Five-locked bolls to the number of 88,500 will yield a bale of cotton in all varieties having a lint index of 6, and 133,500 five-locked bolls will be required in all varieties having a lint index of 4.

A variety of cotton which has a lint index of 4 and a lint percentage of 33 will have seeds weighing 8.1 grams per hundred, or 12.1 grams per hundred unginned seeds. (Table II.) A variety with a lint index of 5 and the same lint percentage will have seeds weighing 10.1 grams per hundred, or 15.1 grams per hundred unginned seeds. Therefore, if the laborers pick at the rate of 1,500 bolls per hour and the average number of seeds is between 40 and 45 to the boll, 1,500 bolls of the variety with the lint index of 4 will weigh 7,713.7 grams, or 17 pounds and 0.09 ounce. Fifteen hundred bolls of the variety with the lint index of 5 will weigh 9,626.2 grams, or 21 pounds and 3.5 ounces, of seed cotton. Thus, there is a difference of 1,912.5 grams, or 4 pounds and 3.4 ounces, per hour, or 24.8 per cent in favor of the variety with the lint index of 5. In other words, the man picking in the variety with the lint index of 5 will gather the same quantity of cotton fiber in eight hours that the one working in the variety with the lint index of 4 will gather in 10 hours, and if both men work a full 10 hours, picking the same number of bolls per hour, the one in the variety with the lint index of 5 will have 24.8 per cent more pounds of seed cotton at the end of the day than the man working in the variety with the lint index of 4. This may account for the fact that pickers often gather more cotton in a day in one man's field than in another's, and may also suggest a reason for the otherwise unexplainable aversion which pickers have for some fields.

TABLE III.—*Comparison of two varieties of cotton grown in southern Georgia.*

Variety.	Lint.			Comparison of 5-locked bolls.					
					Number to the pound.		Number required to yield one 500-pound bale.		
	Percentage.	Index.	Length.	Weight of 10 bolls.	Of seed cotton.	Lint.	Total.	Per plant (at 10,600 plants per acre).	Estimated percentage.
			Inches.	*Grams.*					
A	36	8.7	1 1/16	109	42	116	58,000	5.5	40 to 45
B	41	6.4	7/8	72	63	158	79,000	7.5	20 to 25

On a recent visit to southern Georgia the writer was asked to compare two varieties of cotton growing in the neighborhood, for the benefit of the local cotton farmers. Ten 5-locked bolls of each of the two varieties were secured and examined, with the results shown in Table III. Variety B was the local favorite, since it had the higher percentage of lint. In this section of Georgia, although the smaller farmers pick their own cotton, they had not appreciated the disadvantages of the variety they were growing, even from the standpoint of the labor of picking.

INCREASING THE LINT PERCENTAGE DOES NOT ALTER THE COST OF PRODUCTION IF THE LINT INDEX REMAINS CONSTANT.

In the case referred to, in which the same lint index was traced through all percentages of lint from 25 to 42, the labor of harvesting the crop and the efficiency of the laborers themselves are the same in each case. For, since the lint index, which determines the number of bolls to the pound of fiber, is constant, the number of seeds and of bolls producing a pound of fiber also remains constant.

There is another relation of the lint index which has not been worked out as yet, but which may be suggested here as a possibility. Both Tables I and II show that the higher lint indexes are associated with the heavier seeds. Heavy seeds have a relatively larger percentage of kernels to hulls than smaller or lighter seeds, and the oil content may be found to be associated also with heavier seeds.

IMPROVED METHODS FOR OBTAINING LINT PERCENTAGES.

The usual method of obtaining the percentage of lint in cotton varieties is to weigh a random specimen of the seed cotton and gin it; then reweigh the seed, calculate the percentage of seed, and set down the difference as the percentage of lint. Few workers in cotton selections weigh the lint after ginning and calculate the percentage of lint directly. These operations occasion considerable labor and care in making the various records, and, of course, the more numerous the calculations and entries in the records the greater the liability to error. Owing to these and other considerations it has been found advantageous to begin with a standard sample of seed cotton of 100 grams in weight, a method which avoids the necessity for recording the original weight of the specimen. After this standard sample has been ginned the seeds are weighed. Each gram of seed then represents 1 per cent of the original seed cotton. The difference between the weight of the seed and 100 grams is the weight of the lint removed in ginning and is also the percentage of lint. Thus, this method avoids the necessity for recording the net weight of the seed and of calculating the percentage of lint.

Since this procedure for finding the percentage of lint has been in operation, a balance has been placed on the market equipped for the

direct reading of the lint percentage. The beam is graduated to a maximum of 100 grams. A second graduation is placed on the lower edge of the beam at the right. Reading in the reverse direction, or to the left, this graduation shows the difference between 100 grams

FIG. 1.—Torsion-balance beam, graduated for the direct reading of the lint percentage of cotton.

and the weight indicated, as the rider is moved from the 100-gram mark toward zero. (Fig. 1.) By the use of this balance the percentage of lint, which in this case is the difference between the net weight of the seed and the original weight of the specimen of seed cotton, may be read at a glance without the trouble of subtraction.

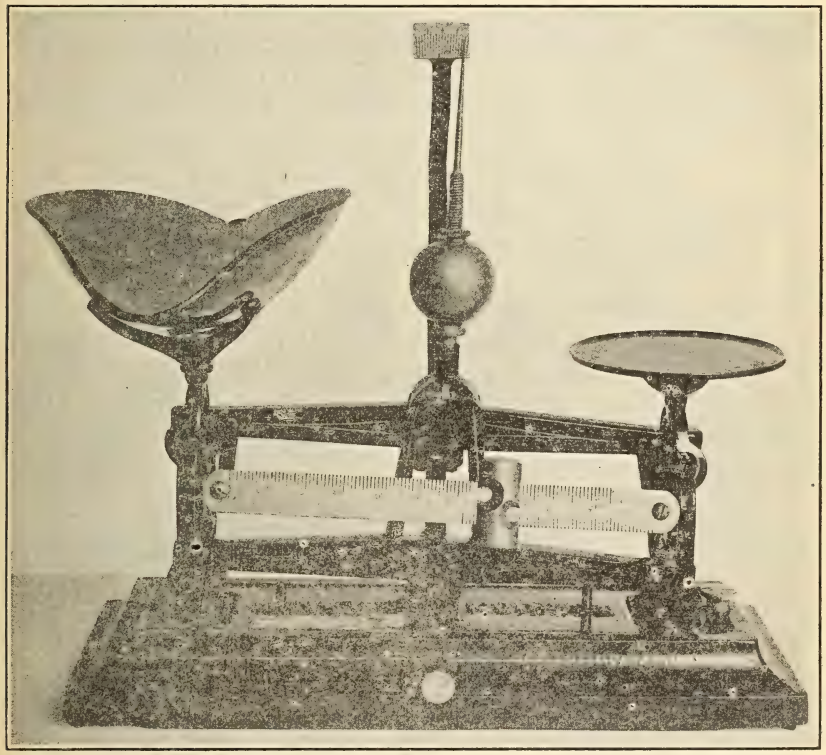

FIG. 2.—A balance for the direct reading of the lint percentage of cotton.

Thus, if the seeds of a 100-gram sample of seed cotton are found after ginning to weigh 65 grams, the weight of the lint removed is 35 grams, which is 35 per cent of the original weight of the seed cotton, or the lint percentage. (Fig. 2.)

ADVANTAGES OF USING SAMPLES OF STANDARD WEIGHT.

By the use of a balance such as that just described, the sample is standardized and the work of ascertaining the lint percentage reduced to two entries in the records, the name of the selection and the percentage of lint, and all calculations have been avoided.

The use of the standard sample of seed cotton has other very material advantages. It will be shown that the adoption of the standard sample simplifies the methods of calculating lint indexes and the weights of seeds, that the number of seeds of a standard sample is a direct indication of their size, and that tables may now be prepared by which planters without special apparatus may ascertain the lint index of a variety.

METHODS OF CALCULATING LINT INDEXES AND SEED WEIGHTS.

Having used the standard sample of 100 grams of seed cotton and determined the percentage of lint, which, as has been seen, is the actual weight of the lint, the lint index and the weight of the seeds per hundred may be obtained from the data in hand by the use of the following formulas:

$$\frac{\text{Percentage of lint}}{\text{Number of seeds in specimen}} \times 100 = \text{lint index.}$$

$$\frac{\text{Percentage of seed}}{\text{Number of seeds in specimen}} \times 100 = \text{weight of 100 seeds.}$$

The lint index may also be determined in the following manner. If a sensitive balance is to be had, the weight of 100 fair average seeds fairly ginned should be secured by actual weighing, or, better, the average weight of two lots of 100 seeds should be secured. The following formula may then be used to determine the lint index:

$$\frac{\text{Weight of 100 seeds}}{\text{Percentage of seed}} \times \text{lint percentage} = \text{lint index.}$$

NUMBER OF SEEDS IN A STANDARD SAMPLE AN INDICATION OF THEIR SIZE.

In the absence of a balance sensitive to the hundredth of a gram, on which such small lots of seeds as 100 may be accurately weighed, the use of the standard specimen of seed cotton has another advantage in that the number of seeds in the specimen may be taken as a direct indication of their size, and the weight of the seeds per hundred may be found by reference to Table IV. This table gives a list of the numbers of seeds in standard specimens of 100 grams of seed cotton, calculated for various percentages of lint and weights of seed per hundred.

Having ascertained the weight of the seeds per hundred from Table IV and knowing the percentage of lint, the lint index may then be ascertained by reference to Table I.

TABLE IV.—*Number of seeds in a standard sample of 100 grams of seed cotton at different lint percentages and weights of seed per hundred.*

Weight of 100 ginned seeds.	Percentage of lint.																	
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Grams.	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*	*Seeds*
6.0	1,250	1,233	1,216	1,200	1,183	1,166	1,150	1,132	1,116	1,100	1,083	1,066	1,050	1,033	1,016	1,000	983	966
6.5	1,153	1,138	1,123	1,107	1,092	1,076	1,061	1,046	1,030	1,015	1,000	984	969	953	938	923	907	892
7.0	1,071	1,057	1,042	1,028	1,014	1,000	985	971	957	942	928	914	900	885	871	857	842	828
7.5	1,000	986	973	960	946	933	920	906	893	880	866	853	840	826	813	800	786	773
8.0	937	925	912	900	887	875	862	850	837	825	812	800	787	775	762	750	737	725
8.5	882	870	858	847	835	823	811	800	788	776	764	752	741	729	717	705	694	682
9.0	833	822	811	800	788	777	766	755	744	733	722	711	700	688	677	666	655	644
9.5	789	778	768	757	747	736	726	715	705	694	684	673	663	652	642	631	621	610
10.0	750	740	730	720	710	700	690	680	670	660	650	640	630	620	610	600	590	580
10.5	714	704	695	685	676	666	657	647	638	628	619	609	600	590	580	571	561	552
11.0	681	672	663	654	645	636	627	618	609	600	590	581	572	563	554	545	536	527
11.5	652	643	634	626	617	608	600	591	582	573	565	556	547	539	530	521	513	504
12.0	625	616	608	600	591	583	575	566	558	550	541	533	525	516	508	500	491	483
12.5	600	592	584	576	568	560	552	544	536	528	520	512	504	496	488	480	472	464
13.0	576	569	561	553	546	538	530	523	515	507	500	492	484	476	469	461	453	446
13.5	555	548	540	533	525	518	511	503	496	488	481	474	466	459	451	444	437	429
14.0	535	528	521	514	507	500	493	485	478	471	464	457	450	442	435	428	421	414
14.5	517	510	503	496	489	482	475	468	462	455	448	441	434	427	420	413	406	400
15.0	500	493	486	480	473	466	460	453	446	440	433	426	420	413	406	400	393	386
15.5	483	477	470	464	458	451	445	438	432	425	419	412	406	400	393	387	380	374
16.0	468	462	456	450	443	437	431	425	418	412	406	400	393	387	381	375	368	362

PLANTERS CAN ESTIMATE THE LINT INDEX.

Since 100 grams equal approximately $3\frac{1}{2}$ ounces, a grower may determine with fair accuracy the size of the seeds of the variety he plants by ascertaining the number of seeds in $3\frac{1}{2}$ ounces of seed cotton and referring to Table IV. He can then estimate the lint index of his variety by a reference to Table I. For example, if a grower finds 566 seeds in $3\frac{1}{2}$ ounces of his seed cotton and his cotton is ginning out 32 per cent of lint, by reference to Table IV the seed will be found to weigh 12 grams per hundred. Referring then to Table I, under a seed weight of 12 + 32 per cent, the lint index will be found to be 5.64.

SUMMARY.

(1) The percentage of lint is the relation between the weight of the fiber and the weight of the seeds from which the fiber is obtained in the process of ginning and is expressed as a percentage of the unginned seed cotton. The use of a lint percentage originated with buyers of seed cotton, and if used by breeders and growers as a measure of the comparative value of varieties it should be employed with

caution, since it is misleading if used except in connection with the lint index.

(2) An increase in the percentage of lint may be due entirely to a reduction in the size of the seed without change in the quantity of fiber.

(3) The lint index is a measure of the abundance of the fiber rather than a measure of the relation between the weight of the fiber and the weight of the seed, as is the percentage of lint.

(4) The lint index determines the number of bolls yielding a pound of fiber. The number of seeds and of bolls required to produce 1 pound of fiber is constant for all varieties of cotton that have the same lint index, regardless of the percentage of lint.

(5) An increase in the lint index is correlated with an increase in the weight of the seeds and reduces the number of bolts required to produce a pound of fiber.

(6) The lint index is an important factor in the cost of cotton production. An increase of a single gram in the weight of the fiber per hundred seeds, without change in the percentage of lint, materially reduces the labor of picking cotton. The efficiency of the pickers also is thereby increased.

(7) It is essential that a planter know the lint index of a variety, as well as the percentage of lint, in choosing a variety to be planted.

(8) Simple methods for ascertaining the lint index, the lint percentage, and the weight of seeds are described, and tables to simplify computation are given.

(9) The importance is shown of using a standard specimen of 100 grams of seed cotton in making determinations of lint percentages, lint indexes, and the weights of seeds.

(10) A method is described by which a planter, without special apparatus, may estimate the lint index and the size of the seed of a variety of cotton by counting the number of seeds in $3\frac{1}{2}$ ounces of seed cotton and referring to the tables in this bulletin.

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