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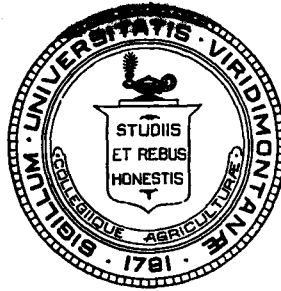
AGRICULTURAL SEED

By ANNA S. LUTMAN

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The agricultural seed sold in Vermont in 1932 compared favorably in quality with that sold during recent years in so far as could be determined by the analysis of the 380 samples drawn from dealers' stocks by station sampling agents last May. Purity guaranties were very well and germination guaranties reasonably well maintained. (Tables 1 to 3, pages 6 to 14.)

The income accruing to the Station by virtue of the operation of the state law is not sufficient to enable it to do a thorough job, but it is made to go as far as may be. Since it is somewhat larger than usual in 1932, the analytical results are given in less condensed form than has been the custom of late years. Furthermore, as is required by the letter of the law, the names and addresses of the local dealers from whose stocks the samples were drawn are included. The data are listed alphabetically by vendor's names—i.e., E. W. Bailey & Co., Barber & Bennett, etc.; and also for each vendor alphabetically by seed names—Alfalfa, Barley, etc. Buyers can readily determine the facts as to their own purchases by reference to the vendor's name and to the type of seed bought, so be it samples were drawn representing such purchases.

Vermont farmers spend many thousands of dollars annually for agricultural seed. It would seem that the small sum available for inspection purposes, approximately \$1,000 annually, was well spent if it acts as a deterrent to the sale of such poor seed as was commonly purveyed a generation ago and if, to some extent, it tends to lessen the likelihood of the sales of adulterated or extremely weedy seed.

Sundry observations concerning the seed law and seed purchase and usage appear on pages 15 to 23.

Several station bulletins issued within the last 20 years dealing with agricultural seed analysis contain information that should be of as much value to Vermont farmers today as when they first saw light. They are in print and will be sent without charge to anyone who may ask for them. A postal card addressed Experiment Station, Burlington, Vermont, giving bulletin number is sufficient.

- Bulletin No. 138. The Viability of Weed Seeds in Feeding Stuffs.
- Bulletin No. 146. The Grass and Clover Seed Trade in Vermont (1909)
- Bulletin No. 170. Weeds, Seeds.
- Bulletin No. 200. Concerning Weeds and Weed Seeds.
- Bulletin No. 205. Concerning the Germination of Seed.
- Bulletin No. 322. Fifteen Years of Seed Inspection.

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BULLETIN 347: AGRICULTURAL SEED

By ANNA S. LUTMAN

The Station sampling agents visited 65 Vermont cities, towns and villages in May, 1932, and drew 380 samples from dealers' stocks, representing 167 of the 223 brands of agricultural seed licensed for sale as follows:

Alfalfa	15	Millet, Hungarian ...	13	Rye	4
Barley	22	Millet, Japanese	30	Soy beans	7
Buckwheat	5	Mixtures	18	Sudan grass	4
Clover, alsike	24	Oats	25	Timothy	36
Clover, red	32	Peas, Canada	16	Vetch	12
Clover, sweet	9	Rape	4	Wheat	7
Corn	67	Redtop	25	Miscellany	4

No sample of 56 brands named below was secured.

LIST OF UNSAMPLED BRANDS

- Barber & Bennett.* Field Peas.
Perley E. Davis, Granby, Mass. Corn.
A. Dickinson Co. Alsike, Ace; Oats; Timothy, Bison.
Eastern States Farmers' Exchange. Alfalfa; Oats; Rye; Mixtures: Rye and Vetch; Timothy and Alsike; Wheat and Vetch; for light, for medium, for heavy pastures; for upland, for lowland meadows; haylands Nos. 3, 4.
T. W. Emerson & Co. Alfalfa; Millets, Hungarian, Japanese; Timothy, Bison; Vetch.
Holbrook Grocery Co. Alfalfa; Barley; Clover, Alsike, Special, White Mountain; Clover, Red, White Mountain; Corn; Millet, Hungarian; Redtop, White Mountain; Timothy and Alsike.
E. T. & H. K. Ide, St. Johnsbury, Vt. Oats.
Page Seed Co. Clover, Alsike; Clover, Red; Clover, Sweet White Blossom; Millet, Hungarian; Peas; Redtop; Timothy.
C. M. Seaver & Co., Williamstown, Vt. Oats.
St. Albans Grain Co. Corn.
Stanford Seed Co. Buckwheat; Rye.
J. B. Varick Co., Manchester, N. H. Corn.
Washington County Farmers' Exchange, Montpelier, Vt. Corn.
N. Wertheimer & Sons. Timothy and Alsike.
Whitney-Eckstein Co. Alfalfa, Eureka; Clover, Alsike, Eureka; Clover, Red, Eureka; Clover, Sweet, Yellow Blossom; Millet, German; Rape; Redtop, Eureka; Vetch, Spring.

Concerning these unsampled brands it may be said that seed sampling is an exceptionally seasonal job. Seed usually comes into the State and is bought and sown within a few weeks. Sampling agents who are in the field in early April find little on sale. The "clean up" men sent out in mid-May to secure samples of commercial fertilizer brands which have come into the State somewhat late in the spring, find seed on sale and sample it; but obviously they can not find every brand. It is fair to assume, moreover, that in several instances relatively few sales were made. In the present inspection fully three-

fourths of the licensed brands were sampled and analyzed. The trade in commercial fertilizers is not so intensely seasonal and from 80 to 85 percent of the brands are usually sampled, representing 95 percent of the usage by Vermont farmers. The commercial feeding stuffs trade is a twelve-months affair and of late years samples representing over 90 percent of the licensed brands have been secured. Furthermore, it should be remembered that whereas the conduct of the fertilizer and feed inspections is not hampered by insufficient income that of the seed inspection is seriously restricted in this respect.

BRANDS SAMPLED AND ANALYZED

The following tables set forth the results secured in the 1932 inspection. Full analyses were not made in most cases, being carried only so far as to give assurance that the purveyor's guaranty was maintained in fact and within the latitude of variation established by the Association of Official Seed Analysts. In doubtful cases analyses were completed. Retests were always made of samples found to yield figures below those of the guaranties made in their behalf.

Table 1, pages 6 to 11, lists those brands of agricultural seed which, as judged by the samples drawn from dealers' stocks and analyzed at the Station, have *substantially fulfilled the guaranties* made in their behalf. This table furnishes the following information:

1. The common name of the seed. i. e., ALFALFA, BARLEY.
2. The brand name and numerical designation of the seed, i. e., Pennant, 27467.¹
3. The name and address of the local dealer from whose stocks the sample was drawn.
4. The purity guaranty made by the vendor setting forth the percentage of pure seed guaranteed to be present.
5. The germination guaranty made by the vendor setting forth the viability of the seed as determined by his tests, usually made by him from December to March preceding the Vermont sales.
6. In certain cases, indicated by the * or **, slight shortages in meeting the germination guaranties. The appearance of a single asterisk (*) at the right of the germination percentage indicates that, as a matter of fact, the station germination test fell short of the guaranty made by the vendor by from two to four percent; of the double asterisk (**) that it fell short by from four plus to six percent. These shortages are within the tolerance limits prescribed by the Association of

¹ The "numerical designation" is placed upon the package by the vendor and serves to identify the lot of seed.

Official Seed Analysts. They were established because of the inevitable variation occurring in a non-manufactured but natural product, because it inevitably happens that station germination tests are made anywhere from two to six months or more after the vendor's tests are made, and, finally, because the viability of a seed lessens as it grows older. Hence these samples are listed as "substantially complying with guaranties."

This table has to do, as has been said, with the brands which have proven to be as good or better than the guaranties made for them.

Table 2 (p. 12) lists guaranties and analyses of mixtures of timothy and alsike, or of timothy and alsike with other seed found on sale by station sampling agents. In this table all of the mixtures are listed whether or not the guaranties are maintained. The table is necessarily a somewhat complicated one, but it is felt that it is essentially self-explanatory to one who carefully studies it. The cases of serious failure to maintain guaranties are indicated by italics.

Table 3 (p. 14) lists those brands of agricultural seed (other than mixtures) which, as judged by the samples drawn from dealers' stocks and analyzed by the Station, *have failed to fulfill the guaranties* made in their behalf by the vendors. The table sets forth:

1. The common name of the seed, i. e., ALFALFA, BARLEY.
2. The brand name and numerical designation of the seed, i. e., Pennant, 27467.
3. The name and address of the local dealer from whose stocks the sample was drawn.
4. The purity guaranty made by the vendor setting forth the percentage of pure seed guaranteed to be present.
5. The actual percentage of purity found. When up to guaranty the fact is indicated by the usage of the letters "OK"; when below guaranty to an extent beyond the regular tolerance limits set forth by the Association of Official Seed Analysts, the figures are given.
6. The germination guaranty made by the vendor setting forth the viability of the seed as determined by his tests, usually made from December to March preceding the Vermont sales.
7. The germination percentage found. When up to guaranty the fact is indicated by the letters "OK"; when below guaranty to an extent beyond the regular tolerance limits established by the Association of Official Seed Analysts, the figures are given.
8. The "hard seeds" statement made by the vendors and the number of hard seeds found by the station analyses in alfalfa, clovers and vetch, the left-hand figure being the vendor's statement and the right hand figure the station results.

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties	
		Purity	Germi- nation
E. W. BAILEY & Co., MONTPELIER, VT.			
OATS, Pennant	A. B. Kilbourne, Bristol.....	99.5	98
Pennant	Richmond Feed Co., Richmond.....	99.5	98
Pennant	Underhill Mill, Underhill.....	99.5	98*
BARBER & BENNETT, INC., ALBANY, N. Y.			
BARLEY, Alpha 2-row, 98817.....	B. T. Henry, North Bennington.....	99	90
BUCKWHEAT, 400.....	J. A. Kilbourne, Bristol.....	98	96
OATS, Michigan, 82059.....	S. E. Smith Estate, West Rutland.....	98.5	96
WHEAT, Marquis Spring, 27368.....	H. W. Myers & Son, Bennington.....	99	97
CALEDONIA MILLS, INC., ST. JOHNSBURY, VT.			
OATS, 40-42 lb. Fancy Selected Swedish..	Caledonia Mills, Inc., St. Johnsbury....	98.5	95*
40-42 lb. Fancy Selected Swedish..	Checkerboard Grain Warehouse, Brattleboro	98.5	95
CHAMPLAIN SEED Co., BURLINGTON, VT.			
CORN, Burlington Dent.....	Thomas & White, Pittsford.....	98	96
Oil Dent.....	W. T. Simonds, Brandon.....	98	96*
CRAYER-DICKINSON SEED Co., INC., BUFFALO, N. Y.			
BARLEY, 6-row, 71-18.....	J. A. Kilbourne, Bristol.....	98	95
CLOVER, Alsike, Pine Tree, 21-521.....	E. W. Bailey & Co., Swanton.....	98.75	83*
CORN, West Branch Sweepstakes, 72-345..	E. M. Bixby & Co., Poultney.....	99	90
Conklin's Early Wonder E. W. C. H.	W. Myers & Son, Bennington.....	99	90
Conklin's Early Wonder.....	E. M. Bixby Co., Poultney.....	99	90*
Improved Leaming, 72-336.....	E. M. Bixby Co., Poultney.....	99	90
Pride of North, 72-345.....	E. M. Bixby & Co., Poultney.....	99	90
MILLET, Japanese, 44-18.....	E. M. Bixby & Co., Poultney.....	98	92
Japanese, 44-18.....	Field & Lawrence, Bellows Falls.....	98	92
Japanese, 44-18.....	Mintzer Bros., Rutland.....	98	92
Japanese, 44-18.....	E. J. Pease, White River Junction.....	98	92
PEAS, Canada Field, 87-213.....	W. A. Church Co., Jonesville.....	98	90
Canada Field, 87-213.....	T. J. McGovern, Cambridge.....	98	90
Canada Field, 87-215.....	Enosburg Grain Co., Enosburg Falls.....	98	90
DELTA SALES Co., DELTA, PA.			
CORN, Addison Co. Special, Kato.....	Elliott & Churchill, Middlebury.....	99	90
A. DICKINSON Co., CHICAGO, ILL.			
ALFALFA, Grimm, 27434.....	City Feed Co., St. Albans.....	99.22	77
Grimm Pine Tree, 27382-3.....	B. T. Henry, North Bennington.....	99.3	81
Pine Tree, 28940.....	Mintzer Bros., Rutland.....	99.24	83
Grimm, 27445.....	A. D. Pease Grain Co., Burlington.....	99.84	81**
Grimm Pine Tree, 27312-3.....	M. F. Proctor, Ludlow.....	99.3	81
Grimm Pine Tree, 27479.....	R. W. Simonds & Co., Fair Haven.....	99	87*
BARLEY, 2-row, 71216.....	Enosburg Grain Co., Enosburg Falls.....	98.88	93*
6-row, 71221.....	J. A. Kilbourne, Bristol.....	97.44	90
6-row, 71221.....	E. J. Pease, White River Junction.....	97.44	90
BUCKWHEAT, Japanese, 76102.....	Farmers' Feed & Grain Co., St. Albans..	99.42	88**
Japanese, 76102.....	E. W. Bailey & Co., Montpelier.....	99.42	88
CLOVER, Alsike, Pine Tree, 21304.....	Brattleboro Grain Co., Brattleboro.....	98.25	87
Mam. Red, Pine Tree, 23953.....	J. A. Kilbourne, Bristol.....	99.36	94
Med. Red, Ace, 24189.....	H. A. Slayton & Co., Morrisville.....	98.04	81
Med. Red, Ace, 24189.....	Miles, McMahon & Co., Stowe.....	98.04	81
Med. Red, Ace 24542.....	E. W. Bailey & Co., Montpelier.....	99	94
Med. Red, Pine Tree, 24236.....	Brattleboro Grain Co., Brattleboro.....	99.22	82
Med. Red, Pine Tree, 24498-99..	A. D. Pease Grain Co., Burlington.....	99.26	95**
Med. Red, Pine Tree, 24579.....	Richmond Feed Co., Richmond.....	99.06	86
Med. Red, Pine Tree, 24236.....	Wallingford Feed Store, Wallingford....	99.22	82
W. B. Sweet Pine Tree, 25155-6	J. A. Kilbourne, Bristol.....	99	83
W. B. Sweet, Pine Tree.....	M. F. Proctor, Ludlow.....	99	82
CORN, Leaming Ensilage, 72684.....	Brattleboro Grain Co., Brattleboro.....	99.5	94
MILLET, German, 46119.....	E. C. Crosby, Danby.....	98.82	86
Hungarian, 47125.....	E. H. Mason, Randolph.....	98.8	82
Hungarian, 47125.....	H. A. Slayton & Co., Morrisville.....	98.8	82
Hungarian, 47130.....	E. W. Bailey & Co., Montpelier.....	99.6	84
Hungarian, 47146.....	W. S. Wright, Lyndonville.....	99.3	85
Japanese.....	F. H. Gillingham & Sons, Woodstock....	99.18	87
Japanese, 44-18.....	J. A. Kilbourne, Bristol.....	98	92

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 18)

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES—Continued

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties	
		Purity	Germination
MILLET, Japanese, 44-18.....	Wallingford Feed Store, Wallingford....	98	92
ORCHARD GRASS, 37256.....	F. H. Gillingham & Sons, Woodstock....	78.7	85
REDTOP, Ace, 30698.....	H. A. Slayton & Co., Morrisville.....	90.3	90*
Ace, 30741.....	M. F. Proctor, Ludlow.....	91.9	92**
Ace, 30788.....	Farmers' Exchange, Franklin.....	96.2	90**
Ace, 30893.....	Mintzer Bros., Rutland.....	90.1	90**
Pine Tree Fancy, 30969.....	J. A. Kilbourne, Bristol.....	95.5	90
Pine Tree, 30990.....	E. G. & A. W. Norton, Vergennes.....	95.4	92**
RYE, Spring, 74169.....	E. W. Bailey & Co., Montpelier.....	96.63	85*
Spring, 74169.....	J. A. Kilbourne, Bristol.....	96.63	85*
SOY BEANS, Manchu.....	F. H. Gillingham & Sons, Woodstock.....	99.5	90
SUDAN GRASS, 98128.....	J. A. Kilbourne, Bristol.....	99.7	91*
TIMOTHY, Globe, 67324.....	Estey Hardware Co., Richford.....	99.9	95
Pine Tree, 68102.....	Brattleboro Grain Co., Brattleboro.....	99.7	99**
Pine Tree, 68019.....	A. D. Pease Grain Co., Burlington.....	99.3	94
Globe, 67324.....	Richford Feed Co., Richford.....	99.9	95
Bison, 67287.....	H. A. Slayton & Co., Morrisville.....	98	90
Pine Tree, 68043.....	J. G. Turnbull Co., Orleans.....	99.7	95
Pine Tree, 67675.....	Wallingford Feed Store, Wallingford....	99.75	96*
VETCH, Pine Tree, 99129.....	Richmond Feed Co., Richmond.....	99.7	88 8/10
DOUGHTEN SEED CO., JERSEY CITY, N. J.			
CLOVER, Alsike, Faith, A-1362.....	Thomas & White, Pittsford.....	96	85 7/11
Med. Red, Domestic Faith.....	Thomas & White, Pittsford.....	98.52	85 5/4 1/2
MILLET, Japanese, M-3479.....	Thomas & White, Pittsford.....	98.62	85*
REDTOP, Faith, R2671.....	Thomas & White, Pittsford.....	92.4	91**
Faith, R2694.....	Ray P. Webster, Barton.....	90.6	90**
TIMOTHY, Freedom, T-399.....	E. M. Bixby Co., Poultney.....	99.8	92
Freedom, T-399.....	Thomas & White, Pittsford.....	99.8	92
EASTERN STATES FARMERS' EXCHANGE, SPRINGFIELD, MASS.			
BARLEY, Minn. Velvet.....	E. A. Martin, Essex Junction.....	99.4	90
BUCKWHEAT, Japanese.....	E. T. Ryder & Son, Morrisville.....	99.6	92
CLOVER, Alsike.....	H. Stannard, Fair Haven.....	98.86	73 22/12 1/4
Med. Red.....	H. Stannard, Fair Haven.....	99.15	79 16/8 1/2
W. B. Sweet Certiseed.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	99.35	89
CORN, Certiseed Cornell, 11.....	D. B. Bromley, Danby.....	99.25	95*
West Branch Sweepstakes.....	H. Stannard, Fair Haven.....	99.25	90
Virginia Eureka.....	H. Stannard, Fair Haven.....	99.5	95
MILLET, Hungarian Indiana.....	A. R. Warren, Morrisville.....	99	82
Japanese.....	A. R. Warren, Morrisville.....	98.9	70
PEAS, Field, Chang Certiseed.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	99.4	85
RAPE, Dwarf Essex.....	E. A. Martin, Essex Junction.....	99.45	89
Dwarf Essex.....	E. T. Ryder & Son, Morrisville.....	99.45	89
REDTOP, Fancy Solid.....	E. T. Ryder & Son, Morrisville.....	95.95	90*
SOY BEANS, Wilson.....	E. T. Ryder & Son, Morrisville.....	99.5	90
Manchu.....	H. K. Westall, Richmond.....	99.45	90*
Manchu Certiseed.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	99.45	90
SUDAN GRASS, Illinois.....	E. T. Ryder & Son, Morrisville.....	97	90**
SUNFLOWER, Illinois Certiseed.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	99	82**
TIMOTHY, Midwest.....	E. A. Martin, Essex Junction.....	99.57	90
Midwest.....	A. R. Warren, Morrisville.....	99.57	90
Midwest.....	H. K. Westall, Richmond.....	99.57	90
VETCH, Hairy.....	E. A. Martin, Essex Junction.....	99.5	76 8/6
WHEAT, Marquis Spring Montana.....	E. A. Martin, Essex Junction.....	99.5	92
THOS. W. EMERSON & Co., BOSTON, MASS.			
BARLEY, Bald.....	Guy E. Longeway, Coventry.....	97.04	75*
6-row.....	Guy E. Longeway, Coventry.....	99.5	95
CLOVER, Alsike.....	Guy E. Longeway, Coventry.....	98.95	85 0/10 1/4
CORN, Emerson's Sncial Sweepstakes.....	Howard Hardware Co., Bellows Falls.....	98	92
OATS, Mammoth Cluster.....	Howard Hardware Co., Bellows Falls.....	97	99
PEAS, Canada Field.....	Howard Hardware Co., Bellows Falls.....	98	90
REDTOP, No. 1.....	C. H. Utley, Hardwick.....	91	90**
TIMOTHY, Bay State, 125.....	Howard Hardware Co., Bellows Falls.....	99.7	95
GARDNER SEED CO., ROCHESTER, N. Y.			
CORN, Big Crop Ensilage.....	F. M. Sherman & Co., Newport.....	99	90
MILLET, Japanese, 44-112.....	F. M. Sherman & Co., Newport.....	99.66	91

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 18).

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES—Continued

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties		
		Purity	Germi- nation	
OATS, Granary Filler, XXXX.....	F. M. Sherman & Co., Newport.....	99.5	92	.....
Alberta Cluster, XXXX.....	F. M. Sherman & Co., Newport.....	99.5	92	.....
VETCH, Spring, 1967.....	F. M. Sherman & Co., Newport.....	99.62	92	.....
Hairy or Sand, 1360A.....	F. M. Sherman & Co., Newport.....	99.49	90**	.....
L. P. GUNSON & Co., INC., ROCHESTER, N. Y.				
CORN, Red Robin.....	H. A. Slayton & Co., Morrisville.....	99	90	.....
OATS, Giant Cluster.....	R. H. Pond, East Berkshire.....	99	94**	.....
VETCH, Hairy	H. A. Slayton & Co., Morrisville.....	98.75	90	.....
HALES & HUNTER Co., CHICAGO, ILL.				
CORN, Minnesota, 13.....	E. W. Bailey & Co., Montpelier.....		1	.....
Minnesota, 13.....	Richmond Feed Co., Richmond.....		1	.....
HOLBROOK GROCERY Co., KEENE, N. H.				
CLOVER, Alsike XX, 21291.....	McDonald, Elwell & Co., East Arlington..	93	93**	0/9%
Med. Red. XX.....	Brasor & Barber, Guilford.....	94	92	0/4
MILLET, Japanese XX, 1029.....	Brasor & Barber, Guilford.....	99	90*	.....
Japanese	McDonald, Elwell & Co., East Arlington..	99	90**	.....
OATS, Domestic, 73160.....	F. H. Gillingham & Sons, Woodstock.....	99.5	97	.....
REDTOP, XX, 080208.....	McDonald, Elwell & Co., East Arlington..	85	85	.....
XX, 080208.....	Brasor & Barber, Guilford.....	85	85*	.....
TIMOTHY, Special XX, 1452.....	Brasor & Barber, Guilford.....	97	92*	.....
Extra Fancy White Moun- tain, 68084.....	L. S. Robie, Hardwick.....	99.65	95	.....
W. B. JOHNSON & SON, ESSEX JUNCTION, VT.				
OATS, Recleaned Johnson's Fancy.....	Goddette Bros., Essex Center.....	98	94	.....
Recleaned Johnson's Fancy.....	Johnson Grain Co., Winooski.....	98	94	.....
F. W. KELLEY Co., ST. JOHNSBURY, VT.				
OATS, O. & M. Fancy Swedish.....	A. D. Pease Grain Co., Shelburne Falls..	97	93	.....
MARITIME MILLING Co., INC., BUFFALO, N. Y.				
OATS, White.....	Shelburne Feed Store, Shelburne.....	98	96	.....
MICHIGAN SEED Co., RICHFORD, VT.				
CORN, Early August.....	Mt. Mansfield Cooperative Creamery & Grain Association, Inc., Stowe.....	99	90	.....
O. & M. SEED Co., GREEN SPRINGS, OHIO				
BARLEY, O. & M. 6-row.....	J. O. Middlebrook & Sons, Burlington...	98.5	94	.....
CORN, O. & M. Sweepstakes.....	Depot Cash Feed Co., Chester Depot.....	99	94	.....
O. & M. Leaming.....	Depot Cash Feed Co., Chester Depot.....	99	96	.....
PAGE SEED Co., GREENE, N. Y.				
CORN, Bloody Butcher, 5030.....	Howard Hardware Co., Bellows Falls..	99	93	.....
Cornell 11, 5045.....	E. M. Bixby Co., Poultney.....	99	92	.....
West Branch Sweepstakes Paseco, 5065.....	E. J. Davis Hardware Co., Chester Depot	99	93	.....
Sanford White Flint Paseco, 5310.....	E. J. Davis Hardware Co., Chester Depot	99	92	.....
N. W. Red Dent, 5035.....	E. M. Bixby Co., Poultney.....	99	94	.....
Golden Nugget, 1160.....	E. M. Bixby Co., Poultney.....	99	93	.....
Leaming.....	Howard Hardware Co., Bellows Falls.....	99	93	.....
Eureka, 5050.....	Howard Hardware Co., Bellows Falls.....	99	93	.....
MILLET, Japanese Paseco, J 5 C 30.....	Howard Hardware Co., Bellows Falls.....	95	85*	.....
Japanese, J 5 C 30.....	Howard Hardware Co., Bellows Falls.....	95	85*	.....
Japanese, J 5 C 32.....	Fred W. Davis, Chester.....	96	90	.....
Japanese, J 5 C 32.....	C. E. Lanpher, Morrisville.....	96	90	.....
DAVID H. RISING, EASTON, PA.				
CORN, Early King.....	W. C. Landon & Co., Rutland.....	99	95	.....
Early King.....	C. M. Seaver & Co., Williamstown.....	99	95	.....

¹ The Hales & Hunter Co. do not guarantee their product as required by state law. Their local agents have been advised that future disregard of the law in this respect will result in report to the State's Attorney for prosecution. The two samples were 100 and 99.55 percents pure and 95.5 and 92 percents germinated, being of average quality. In other words, buyers were in no wise disadvantaged except that they were not supplied with the information to which they were entitled at the time of purchase.

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 1814)

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES—Continued

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties	
		Purity	Germination
ROSS BROS. CO., WORCESTER, MASS.			
CORN, Sheffield's World's Prize Flint....	E. J. Davis Hardware Co., Chester Depot	99	98
ST. ALBANS GRAIN CO., ST. ALBANS, VT.			
BARLEY, Fancy 6-row.....	Mintzer Bros., Rutland.....	99	97
Fancy 6-row.....	Price Grain Co., Middlesex.....	99	97
Fancy 6-row.....	C. H. Stearns & Son Co., Johnson.....	99	97
Fancy 6-row.....	Wirthmore Feed Store, Enosburg Falls.....	99	97*
OATS, Hygrade Fancy.....	Richmond Cash Grain Store, Richmond.....	98	95
Hygrade Fancy.....	W. J. Trombley, Fairfax.....	98	95
Wirthmore Fancy.....	S. E. Smith Estate, West Rutland.....	99	97
Wirthmore Fancy (Northern Grown).....	H. Waite & Son, Morrisville.....	99	98*
Wirthmore Fancy.....	Price Grain Co., Middlesex.....	99	98*
SEABOARD SEED CO., PHILADELPHIA, PA., AND BINGHAMTON, N. Y.			
MILLET, Japanese, Conklin's Pure			
Quill, L 2326.....	Mintzer Bros., Rutland.....	96.87	89.5
TIMOTHY, Conklin's King, F 4140.....	Mintzer Bros., Rutland.....	99.66	92
STANFORD SEED CO., INC., BUFFALO, N. Y.			
ALFALFA, Grimm Michigan, 5797.....	E. T. Chatterton, Middlebury.....	99.36	78
Grimm Michigan, 5797.....	E. J. Davis Hardware Co., Chester Depot	99.36	78
Grimm Michigan, 5797.....	W. B. Johnson & Son, Essex Junction.....	99.36	78
Grimm Michigan, 5797.....	H. W. Myers & Son, Bennington.....	99.36	78
Honor, 3501.....	Miles & Vaughan, Arlington.....	99.5	76
BARLEY, 6-row, 2824.....	Danville Grain Co., Danville.....	98	92
6-row, 3810.....	J. H. Spaulding, Ludlow.....	98	90
6-row, 3810.....	H. W. Myers & Son, Bennington.....	98	90
Alpha, 5922.....	Danville Grain Co., Danville.....	98	92
CLOVER, Alsike, Liberty, 5813.....	W. B. Johnson & Son, Essex Junction.....	97.28	84.5*
Alsike, Liberty, 3541.....	A. J. Luke & Co., West Pawlet.....	97.5	85
Alsike, Liberty, 5862.....	H. W. Myers & Son, Bennington.....	97.4	85
Alsike, Liberty, 5862.....	C. H. Utley, Hardwick.....	97.4	85
Alsike, Liberty, 5862.....	Roy G. Whitman, North Bennington.....	97.4	85
Alsike, Liberty, 5862.....	Danville Grain Co., Danville.....	97.4	85
Alsike, Reliable, 5815.....	W. E. Frost, Middletown Springs.....	96.36	86
Alsike, Reliable, 5815.....	Miles & Vaughan, Arlington.....	96.36	86
Mam. Red, Liberty.....	Miles & Vaughan, Arlington.....		†
Med. Red, Liberty, 5864.....	E. J. Davis Hardware Co., Chester Depot	99.04	85
Med. Red, Liberty, 5864.....	Miles & Vaughan, Arlington.....	99.04	85
Med. Red, Liberty, 5864.....	H. W. Myers & Son, Bennington.....	99.04	85
Med. Red, Liberty, 5864.....	Geo. H. Eldred, East Wallingford.....	99.04	85
Med. Red, Reliable, 5944.....	Danville Grain Co., Danville.....	98	92*
Med. Red, Reliable, 5849.....	W. E. Frost, Middletown Springs.....	98.5	85
Med. Red, Reliable, 5849.....	W. C. Landon & Co., Rutland.....	98.5	85
W. B. Sweet, 3651.....	W. C. Landon & Co., Rutland.....	99.56	80.25
W. B. Sweet, 3651.....	H. W. Myers & Son, Bennington.....	99.56	80.25
CORN, Improved Pride of North, 3759.....	H. M. Brown & Co., Castleton.....	98	94
Honor Bloody Butcher, 5837.....	F. C. Crosby, Danby.....		†
Honor Cornell 11, 3759.....	A. J. Luke, & Co., West Pawlet.....	98	94
Honor, Improved Leaming, 5830			
Honor, West Branch Sweep-stakes, 3893.....	Roy G. Whitman, North Bennington.....	98	94
C. P. Ensilage, 3829.....	H. W. Myers & Son, Bennington.....	98	93
Honor C. P. Special, 5910.....	A. J. Luke & Co., West Pawlet.....	98	93
Honor Golden Nugget, 3841.....	H. W. Myers & Son, Bennington.....	98	94**
Honor Golden Nugget, 3841.....	Miles & Vaughan, Arlington.....	98	93
Honor Improved Leaming, 5923.....	H. W. Myers & Son, Bennington.....	98	93*
Honor Golden Nugget, 3841.....	H. W. Myers & Son, Bennington.....	98	93
Honor Luce's Favorite.....	H. W. Myers & Son, Bennington.....	98	93
Honor Luce's Favorite, 3767.....	H. W. Myers & Son, Bennington.....	98	93*
Honor Sweepstakes, 3893.....	Roy G. Whitman, North Bennington.....	98	93
Honor Pride of Nishna, 7700.....	R. W. Simonds & Co., Fair Haven.....	98	93
Honor Pride of Nishna, 7700.....	R. W. Simonds & Co., Fair Haven.....	98	93
Honor Cornell 11, 3759.....	Roy G. Whitman, North Bennington.....	98	94
MILLET, Hungarian, 3400.....	S. E. Smith Estate, West Rutland.....	99.5	90
Hungarian Super X, 3400.....	Chester Grain Co., Chester Depot.....	99.5	90*
Japanese, 5844.....	E. J. Davis Hardware Co., Chester Depot	98	90**
Japanese, 5844.....	Geo. H. Eldred, East Wallingford.....	98	90**

† Local dealer reports the "tag lost"; found purity 99.6, germination 91.5, hard seeds 5.

‡ No guaranty on package, tested 100, 96.5.

§ In bad condition; attacked and partly eaten by weevils.

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 18).

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES—Continued

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties	
		Purity	Germination
MILLET, Japanese, 1150.....	H. H. Haines, Greensboro.....	97.77	90.5*
Japanese, Fancy, 3781 (N. Y. State Grown).....	H. W. Myers & Son, Bennington.....	98.04	82
Japanese, 3947.....	C. H. Utley, Hardwick.....	97.98	88*
OATS, Honor Improved Pride of the North, 5917.....	R. W. Simonds & Co., Fair Haven.....	98	94
Stanford's Fancy Selected, 5948.....	A. N. Washburn, Bethel.....	97	94
PEAS, Canada, 3607.....	A. D. Pease Grain Co., Shelburne Falls..	98	90**
Canada, 3487.....	R. W. Simonds & Co., Fair Haven.....	98	90
Canada, 3815.....	Chas. M. Seaver & Co., Williamstown..	98	92*
RAPE, 2690.....	H. W. Myers & Son, Bennington.....	99	90*
REDTOP, Fancy, 3370.....	W. E. Frost, Middletown Springs.....	90.44	86*
Fancy, 3370.....	G. H. Eldred, East Wallingford.....	90.44	86**
Fancy, 3370.....	Chester Grain Co., Chester Depot.....	90.44	86*
Fancy, 3355.....	Danville Grain Co., Danville.....	90.52	80.75
Fancy, 3392.....	A. J. Luke & Co., West Pawlet.....	90.55	85.75
Fancy, 3392.....	E. C. Crosby, Danby.....	90.55	85.75
SOY BEANS, Manchu, 3827.....	C. M. Seaver & Co., Williamstown.....	98	90
SUDAN GRASS, 3937.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	98.42	85
SUNFLOWER.....	Munson Store, Morrisville.....	..	..§
TIMOTHY, Honor, 5763.....	M. F. Proctor, Ludlow.....	..	..§
Honor, 5766.....	C. E. & F. O. Burt, Stowe.....	99.8	93
Honor, 5595.....	Munson Store, Morrisville.....	99.8	92.75
Lark, 3586.....	S. A. Reed, Windsor.....	99.8	94
Liberty, 5642.....	Munson Store, Morrisville.....	98.5	93.5
Liberty, 5744.....	H. W. Myers & Son, Bennington.....	99.61	93
Liberty, 5778.....	Chester Grain Co., Chester Depot.....	99.65	91
Liberty, 5720.....	G. H. Eldred, East Wallingford.....	99.62	93
Liberty, 5732.....	J. H. Spaulding, Ludlow.....	99.6	90
VETCH, Spring, 2327.....	Star Feed Store, Burlington.....	99.62	91
Winter.....	C. M. Seaver & Co., Williamstown.....	98	96.5
WHEAT, Spring, 5424.....	Windsor County Farmers' Cooperative Exchange, White River Junction.....	98	90**
Marquis Spring, 3718.....	M. F. Proctor, Ludlow.....	99	95
	A. N. Washburn, Bethel.....	98	90
N. WERTHEIMER & SON, LIGONIER, IND.			
CLOVER, Med. Red, 31313.....	J. F. Curtis, Sharon.....	99.5	90 0/5½
Med. Red, 31313.....	H. Waite & Son, Morrisville.....	99.5	90 0/6¾
Med. Red (N. E. Indiana).....	J. A. Ryan Co., Milton.....	99.5	90* 0/8¼
MILLET, Japanese, 31702.....	City Feed Co., St. Albans.....	99	85
Japanese, 31703.....	R. L. Clark, Barre.....	99	85
REDTOP, 31822.....	J. F. Curtis, Sharon.....	92.64	92**
TIMOTHY, 31532.....	W. A. Church Co., Jonesville.....	99.65	94
31532.....	J. F. Curtis, Sharon.....	99.65	94*
31535.....	Richmond Cash Grain Store, Richmond..	99.75	94
WHITNEY-ECKSTEIN CO., BUFFALO, N. Y.			
ALFALFA, Montana, 2002.....	C. D. Barber & Sons, Windsor.....	99.25	90 0/3½
Ontario Variagated, 28-84.....	Elliott & Churchill, Middlebury.....	99	90 0/10
Grimm Michigan, 2099.....	Elliott & Churchill, Middlebury.....	99.67	90** 0/13¾
Grimm Pan-American Idaho, 2004.....	Elliott & Churchill, Middlebury.....	99.5	90 0/2½
BARLEY, 6-row.....	Elliott & Churchill, Middlebury.....	98	90
6-row.....	A. D. Pease Grain Co., Shelburne Falls..	98	90
BUCKWHEAT, Japanese.....	E. J. Pease, White River Junction.....	98	90
CLOVER, Alsike, Pan-American, 6088.....	Elliott & Churchill, Middlebury.....	98	90 0/1¼
Alsike, Pan-American.....	Lyons Hardware Co., Brattleboro.....	97.63	80 9/7¼
Alsike, Pan-American, 1943.....	G. H. McFarren, Fair Haven.....	98.4	90 0/7¼
Man. Red. Domestic Pan-American, 5231.....	Elliott & Churchill, Middlebury.....	99	90 0/3½
Med. Red, Pan-American.....	H. M. Brown & Co., Castleton.....	99	90 0/7
Med. Red, Domestic Imperator, 5212.....	Checkerboard Grain Warehouse, Brattleboro.....	98	93 0/2
Med. Red, Domestic Herald, 5212.....	Checkerboard Grain Warehouse, Brattleboro.....	98	90 0/0½
Med. Red, Domestic Pan-American, 5141.....	Elliott & Churchill, Middlebury.....	99	90 0/4½
Med. Red, Pan-American, 3141.....	C. E. Lanpher, Morrisville.....	99.04	90 0/3½

§ No guaranty given; tested 99.52, 99.1 purity; 79, 57.5 germination.

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 18).

I. BRANDS SUBSTANTIALLY COMPLYING WITH GUARANTIES—*Concluded*

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Guaranties	
		Purity	Germi- nation
CLOVER, Med. Red, Pan-American, 5212	Lyons Hardware Co., Brattleboro	99.01	93
W. B. Sweet Fancy, 4129	Elliott & Churchill, Middlebury	99.77	86
W. B. Sweet	C. H. Stearns & Son Co., Johnson	99.73	86
W. B. Sweet	Farmers' Feed & Grain Co., St. Albans	99.73	90*
CORN, Minn., 13	C. E. & F. O. Burt, Stowe	98	90
Excelsior Ensilage, 3363	Ernest C. Howard, Bellows Falls	98	90
Improved Pride of North	G. H. McFarren, Fair Haven	98	90
Early 8-row Flint	G. H. McFarren, Fair Haven	98	90
Sweepstakes	G. H. McFarren, Fair Haven	98	90
Golden Glow	G. H. McFarren, Fair Haven	98	90
Improved Leaming	G. H. McFarren, Fair Haven	98	90
Cornell 11	G. H. McFarren, Fair Haven	98	90
Cornell 11	E. L. Thompson, Poultney	98	90
Pride of North	E. L. Thompson, Poultney	98	90
Golden Nugget	C. H. Utley, Hardwick	98	90
Golden Nugget	E. L. Thompson, Poultney	98	90
MILLET, Hungarian	C. D. Barber & Sons, Windsor	99	90
Hungarian	C. E. & F. O. Burt, Stowe	99	90
Hungarian	Elliott & Churchill, Middlebury	98.69	90**
Japanese	H. M. Brown & Co., Castleton	98.69	92
Japanese Fancy	Checkerboard Grain Warehouse, Brattleboro	98.69	90
Japanese Fancy J. M., 2312	Lyons Hardware Co., Brattleboro	98.69	90
Japanese	G. H. McFarren, Fair Haven	98	90
OATS, Swedish Select	A. D. Pease Grain Co., Shelburne Falls	98	90
ORCHARD GRASS, Fancy	C. D. Barber & Sons, Windsor	82	80
PEAS, Canada Field	Nelson-Warner Co., Springfield	98	90
REDTOP, Imperator, 5087	Checkerboard Grain Warehouse, Brattleboro	90	90**
Pan-American	Brattleboro Grain Co., Brattleboro	92	90**
Pan-American	R. H. Brown & Co., Brattleboro	92	90**
Pan-American	A. D. Pease Grain Co., Burlington	92	90**
Pan-American	T. J. McGovern, Cambridge	92	90**
Fancy	Elliott & Churchill, Middlebury	92	90*
Pan-American	Lyons Hardware Co., Brattleboro	92.9	90**
Pan-American	E. L. Thompson, Poultney	92	90**
RYE, Spring	A. D. Pease Grain Co., Burlington	98	90
Spring	A. D. Pease Grain Co., Burlington	98	90*
SOY BEANS, Ito San	E. T. & H. K. Ide, St. Johnsbury	98	90
SUDAN GRASS	H. M. Brown & Co., Castleton	97.06	90
TIMOTHY, Pan-American	W. E. Broughton, Poultney	99.6	90
Pan-American	R. H. Brown & Co., Brattleboro	99.6	90*
Imperator, 657	Checkerboard Grain Warehouse, Brattleboro	99.11	90
TIMOTHY, Herald	Checkerboard Grain Warehouse, Windsor	98.1	90*
Gold Medal	Farmers' Feed & Grain Co., St. Albans	99.75	94
Pan-American, 67744	LaFountain-Woolson Co., Springfield	99.6	90
Pan-American	Lyons Hardware Co., Brattleboro	99.6	90
Pan-American	E. L. Thompson, Poultney	99.6	90
VETCH, Winter	E. T. & H. K. Ide, St. Johnsbury	99.15	92*
Winter	C. E. Lanpher, Morrisville	98	90**
WHEAT, Marquis Spring	E. W. Bailey & Co., Swanton	98	90
Marquis Spring	Farmers Feed & Grain Co., St. Albans	98	90
Marquis Spring	C. M. Seaver & Co., Williamstown	98	90
F. H. WOODRUFF & SONS, MILFORD, CONN.			
CORN, Eureka Ensilage	W. C. Landon & Co., Rutland	99	90 ¹
Improved Leaming	W. C. Landon & Co., Rutland	99	90
Sanford White Flint	W. C. Landon & Co., Rutland	99	90
Longfellow	W. C. Landon & Co., Rutland	99	90
PEAS, Canada Field	W. C. Landon & Co., Rutland	99	90
S. D. WOODRUFF & SONS, ORANGE, CONN.			
CORN, Improved Leaming, 3398	Mintzer Bros., Rutland	99	96 ²
Select Beauty	E. L. Thompson, Poultney	99	96 ³

¹ Unguaranteed; tested 100, 99.

² Unguaranteed as to purity; tested 100.

³ Unguaranteed; tested 100, 95.5.

* 2 to 4 percent; ** 4.1 to 6 percent below guaranty but well within tolerance limits (see pages 4, 5, 18).

II.—TIMOTHY AND ALSIKE MIXTURES (B TO E, H TO S). TIMOTHY, ALSIKE AND RED CLOVER MIXTURES (A, F). TIMOTHY, ALSIKE, RED CLOVER AND REDTOP MIXTURES (G)

	Purity						Germination								†	
	Timothy		Alsike		Totals		Timothy		Alsike		Totals		Hard seed			
	Guar.	Found	Guar.	Found	Guar.	Found	Guar.	Found	Guar.	Found	Guar.	Found	Guar.	Found		
A*	83.7	84.	14.9	10.	102.3	97.5	90.	92.5	88.	89.	89.7	91.9	..	11.5	Apr.	
B	68008	76.57	83.	20.43	13.5	97.	96.5	..	95.5	..	77.5	93.	91.8	..	9.5	Mar.
C	68008	76.57	88.5	20.43	10.	97.	98.5	..	95.25	..	76.	93.	91.1	..	16.	Mar.
D	68060	75.3	85.	15.31	10.	90.61	95.	92.	89.25	90.	79.	91.7	87.5	..	16.	Apr.
E	68139	75.35	73.25	20.14	22.5	95.49	95.75	94.	93.	90.	86.5	93.2	91.6	..	10.5	May
F*	Hayland No. 1	48.	46.	20.	19.	99.1	98.	..	93.	..	83.5	85.	89.7	6.	20.5	Dec.
G*	Hayland No. 2	40.	34.75	16.	15.	98.6	98.25	90.	95.	96.	94.5	92.2	92.2	..	7.25	Dec.
H	67643	72.66	65.25	21.93	32.5	94.59	97.75	92.	91.	94.	83.25	92.5	89.	..	10.25	
I	4640	76.	84.	20.05	14.	96.05	98.	92.	96.75	90.	79.25	91.6	93.	..	18.25	
K	2911	76.58	78.	20.4	19.	96.98	97.	88.	92.75	90.	76.5	88.4	89.2	8.	14.	Dec.
L	5774	76.74	72.25	20.7	24.5	97.44	96.75	92.	95.25	84.	81.	90.3	92.3	8.5	8.75	
M	5774	76.74	79.	20.7	17.5	97.44	96.5	92.	95.5	84.	75.5	90.3	91.1	8.5	12.5	
N	31528	74.9	77.	20.45	19.	95.35	96.	92.	88.	87.	63.	90.9	82.6	..	5.	Feb.
O	31528	74.9	67.25	20.45	30.	95.35	97.25	92.	85.25	87.	61.	90.9	80.	..	5.	Feb.
P	4515	79.01	91.	20.02	6.5	99.03	97.5	93.	92.	94.	89.5	91.2	91.5	10.	8.	Feb.
Q	4514	83.7	82.6	14.9	13.	98.6	95.6	90.	92.75	88.	85.5	89.7	91.6	13.	8.5	Jan.
R		71.14	75.	26.58	23.	97.72	98.	90.	91.75	91.	80.5	89.2	89.4	16.	10.	Apr.
S	4514	83.7	80.75	14.9	16.5	98.6	97.25	90.	91.5	88.	83.	89.8	90.3	13.	10.	Jan.

Note.—Italics indicate failure to meet guaranty.

† Date of vendor's germination test.

* A Red clover: purity guaranty 3.7, found 3.5; germination guaranty 90, found 94.

* F Red clover: purity guaranty 32, found 33; germination guaranty —, found 88.5.

* G Red clover: purity guaranty 24, found 25; germination guaranty 95, found 90.75. Redtop: purity guaranty 20, found 23.5; germination guaranty 90, found 86.25.

"Inert matter" ranged from 0.5 to 3 percent, being above 1.5 percent in only three cases; "commercial seed" from 0 to 1.5 percent, being above 1 percent in only three cases; "foreign seed" from 0.5 to 2 percent, being above 1 percent in only two cases.

A Product of and sampled of Champlain Seed Co.

B-E Product of A. Dickinson Co.; sampled respectively of Powell & Comings Co., Richford; Richford Feed Co., Richford; E. G. & A. W. Norton, Vergennes; F. H. Gillingham & Son, Woodstock.

F-G Product of Eastern States Farmers' Exchange; sampled respectively of A. R. Warren, Morrisville; Gardenside Nurseries, Shelburne.

H Product of Gardner Seed Co.; sampled of F. M. Sherman & Co., Newport.

I Product of L. P. Gunson & Co.; sampled of H. A. Slayton & Co., Morrisville.

K-M Product of Stanford Seed Co.; sampled respectively of A. D. Fease Grain Co., Shelburne Falls; Chester Grain Co., Chester Depot; Godette Bros., Essex Center.

N-O Product of N. Wertheimer & Sons; sampled respectively of E. M. Holt & Co., Northfield; W. A. Church Co., Jonesville.

P-S Product of Whitney-Eckstein Co.; sampled respectively of H. M. Brown & Co., Castleton; Champlain Seed Co. of Burlington; Lyons Hardware Co., Brattleboro; W. S. Rublee, East Berkshire.

Mixtures of timothy and alsike are hard to sample. The two seeds are so unlike in their physical makeup that separation may occur in the bag. On this account an accurate sample is not always secured when the standard A. O. S. A. sampling method is employed. For example, the two samples N and O, drawn from the same lot of seed No. 31528 at two points 40 miles apart, were guaranteed to be 74.9 (timothy) and 20.45 (alsike) pure. The samples analyzed, respectively, 77 and 67.25 percents of pure timothy, 19 and 30 percents pure alsike. The total purity figures—96 and 97.25—were closely alike and were above the total guaranty. There seems every reason to believe that the bags, when packed, contained what they were said to contain in spite of analytical shortages of alsike in one sample and of timothy in the other and of corresponding overages. *Generally, not always but generally, more reliance should be placed on total purity and germination guaranties and analyses than on those of individual ingredients.*

Theoretically sample A, the product of the Champlain Seed Co. of Burlington, falls somewhat below the purity guaranty made for it. Of course, the guaranty—102.3 percent—is an absurd one. When calculated to the proper figures for the three ingredients 80.6, 14.3, 3.7 the total is 98.6 and the shortage is not a bad one, although outside of tolerance limits.

The following samples were deficient in respect to total guaranties to an extent beyond tolerance limits:

- A. Champlain Seed Co. Purity.
- F. Eastern States Farmers' Exchange. Purity.
- N, O. N. Wertheimer & Sons. Germination.
- P, Q, S. Whitney-Eckstein Co. Purity.

The "hard seed" problem is still with us. Their field value bids fair to be a moot question for some time. Some vendors declare them and some do not. Some include them in germination guaranties directly or by implication and some do not. It is not always easy for the seed analyst to determine just how to interpret these divergent statements. Doubtless discrepancies occur in the tables due to this as yet undetermined situation. The seed trade should get together in a huddle and fix upon some uniform and unequivocal method of stating the facts. These facts should be taken into account in the interpretation of the table on page 12 and also that on page 14. In this connection the succeeding paragraph in the text on page 15 is pertinent.

III. BRANDS FAILING SUBSTANTIALLY TO COMPLY WITH GUARANTIES

Seed, brand name and numerical designation	WHOLESALE DEALER Local dealer	Purity		Germination	
		Guaranty	Found	Guaranty	Found
E. W. BAILEY & Co., MONTPELIER, VT.					
OATS, Pennant.....	G. M. Medcalf, Chelsea.....	99.5	97.62	98	94.5
CRAVER-DICKINSON SEED Co., INC., BUFFALO, N. Y.					
PEAS, Canada Field, 87-213.....	T. J. McGovern, Jeffersonville.....	98	OK	90	80.5
Field, 87-213.....	Seabury Grain Co., Waterbury.....	98	OK	90	81
A. DICKINSON Co., CHICAGO, ILL.					
BARLEY, 6-row, 71228.....	C. S. Brush & Co., Jericho....	98.68	OK	94	72.5
6-row, 71228.....	H. H. Haines, Greensboro....	98.68	OK	94	80.5
6-row, 71228.....	Underhill Mill, Underhill....	98.68	OK	94	71.5
CLOVER, Alsike, Pine Tree, 21324.....	J. A. Kilbourne, Bristol.....	97.75	OK	95	83
Alsike, Pine Tree, 21285.....	A. D. Pease Grain Co., Burlington.....	99.3	OK	94	82.5
W. B. Sweet, Pine Tree, 25182.....	F. H. Gillingham & Sons, Woodstock.....	99.22	OK	97	89.5
MILLET, Japanese, Pine Tree, 44133.....	W. S. Wright, Lyndonville....	97.12	OK	90	78.5
PEAS, Canada Field.....	F. H. Gillingham & Sons, Woodstock.....	99.5	OK	93	86
Canada Field, 08565.....	R. H. Pond, East Berkshire....	99.5	OK	90	83
VETCH, Hairy.....	Howard Hardware Co., Bel-lows Falls.....	99	OK	90	77
Winter Hairy, 4154.....	F. H. Gillingham & Sons, Woodstock.....	98	OK	90	82
Winter, 2385.....	E. W. Bailey & Co., Montpelier.....	99	OK	90	80
THOS. W. EMERSON & Co., BOSTON, MASS.					
CLOVER, Med. Red.....	Guy E. Longeway, Coventry..	99.3	OK	94	84
HOLBROOK GROCERY Co., KEENE, N. H.					
CLOVER, Mam. Red XX, 024930.....	McDonald, Elwell & Co., East Arlington.....	95	OK	93	73.5
GEO. Q. MOON & Co., INC., BINGHAMTON, N. Y.					
OATS, 40-42 lb.....	Star Feed Store, Burlington..	98	OK	96	78
PAGE SEED Co., GREENE, N. Y.					
CORN, Paseco 8-row Flint, 1475.....	H. W. Myers & Son, Benning-ton.....	99	OK	90	80
SEABOARD SEED Co., PHILADELPHIA, PA., AND BINGHAMTON, N. Y.					
CLOVER, Red, Farmwell Conklin's Crown.....	Mintzer Bros., Rutland.....	99.32	97.9	80	OK
STANFORD SEED Co., BUFFALO, N. Y.					
CLOVER, Alsike, Liberty.....	Danville Grain Co., Danville.....	98.38	OK	94	78
N. WERTHEIMER & SON, LIGONIER, IND.					
CLOVER, Alsike, 31103.....	J. F. Curtis, Sharon.....	99.25	OK	90	81.25
Alsike, 31103.....	Richmond Cash Grain Store, Richmond.....	99.25	OK	90	76.68
Alsike, N. W. Ohio, 31104.....	J. A. Ryan Co., Milton.....	99.15	97	90	OK
Alsike, N. W. Ohio, 31103.....	H. Waite & Son, Morrisville.....	99.25	OK	90	82.25
MILLET, Hungarian, 31700.....	E. M. Holt & Co., Northfield.....	99.38	OK	90	79.5
PEAS, Canada Field.....	C. A. Smith, East Hardwick..	99	OK	92	82
WHITNEY-ECKSTEIN Co., BUFFALO, N. Y.					
ALFALFA, Idaho Blue Tag, 2003.....	Elliott & Churchill, Middlebury.....	99.73	OK	90	76.5
PEAS, Canada Field.....	Elliott & Churchill, Middlebury.....	98	OK	90	82
SOY BEANS, Ito San.....	A. D. Pease Grain Co., Burlington.....	98	OK	90	83.5

Note.—The statements in the last paragraph on page 13 and in the first paragraph on page 15 should be taken into account in connection with some of the clover and alfalfa analyses shown in this table.

Two points should be made concerning the preceding table.

The Albert Dickinson Company claims that their tests for the two alsikes indicate, respectively, 87 sprouts and 8 hard seeds, 84 sprouts and 14 hard seeds. The sampling agent reports the germination guaranties appearing on the package to be as shown in the table. If to the germination figures found by Station tests are added the results secured indicating unguaranteed hard seeds, or even half of the unguaranteed seeds, the total results would indicate substantial compliance with guaranty within tolerance limits. The self-same statement could be made for the Emerson Red Clover, the Stanford Alsike, the Wertheimer Alsikes and the Whitney-Eckstein Alfalfa. It obviously could not be made, however, for the Holbrook or Seaboard Red Clovers. In this connection, the last paragraph in the text immediately preceding table 3 (page 13) dealing with hard seeds should be noted.

The Page Seed Company states concerning the sample of Paseco 8-row Flint Corn, drawn from H. W. Myers & Son of Bennington, that they made their sales in 1931. The sampling agent reports the Page germination test to have been made in April, 1931. However, the goods were exposed for sale a year later, in 1932, and hence the results must be published. Obviously the Page Company is not responsible for the fact that the germination test made over a year after they made their sales to the Vermont local dealer is low of their guaranty.

RESULTS OF INSPECTION

The violations of the law are usually due:

1. To failure to declare purity guaranties on the package. The original sack almost invariably carries this statement; but it often happens that the farmer is not furnished with this information when he buys 10 or more pounds drawn from the original package.
2. To failure to maintain purity guaranties. This lapse does not often occur. Only eight of the 380 samples tested in 1932 were not as good as they were said to be in this respect (tables 2, 3, pp. 12, 14).
3. To failure to declare germination guaranties on the package. The statement under (1) above applies equally well at this point.
4. To failure to maintain germination guaranties. This lapse is more common than is failure to make good the purity of the goods, since 30 of the 380 samples tested this year were seriously deficient in this respect (tables 2, 3). However, in 12 cases if the "hard seed" are added to the sprouts the germination guaranties are made good. In this connection see the paragraph at the top of this page and that at the bottom of page 13.

Some of the violations noted in the tables of this bulletin are of a more or less technical nature. For example, a germination test date may be omitted. However, such an omission is less serious than is a misstatement touching purity or viability.

It has rarely seemed wise or necessary to suggest prosecution in connection with the operation of the seed law. It is felt that publicity is quite as effective a deterrent as is prosecution, especially in view of the fact that the purveyors are usually located without state borders and can not be reached. The best thing the Station can do when seed is seriously misbranded is to see to it that sales are discontinued. However, it should be remembered that shipments usually enter the State only a few weeks before their use. Samples can only be drawn from seed which is actually on sale. The relatively small sum available for the conduct of the inspection does not enable the Station to employ a large force of seed samplers or of seed analysts; and trained analysts are few in number. Hence it is that the analytical work can rarely be completed before October 1. By that time, of course, most of the seed has been sold, sown and the crop grown and, in the relatively rare cases of very serious misstatement, the mischief is done.

It is only fair to say, in this connection, that the seed trade as a whole has been sympathetic with the purpose of the law and sincerely tries to conform therewith. The Station on its part, in the enforcement of a law which is not in all respects ideal, has not meant unduly to harass or discommode any person engaged in the seed business within or without state borders. It is careful to notify purveyors of the analytical results prior to their publication and to advise local dealers of deficient goods.

CONCERNING THE SEED LAW

The Vermont law (No. 107 of the Act of 1925) provides:

1. That seed sold in lots of 10 pounds or more shall bear upon the package the following information: (a) Common name of seed; (b) percentage of purity; (c) percentage of weed seeds; (d) name and number per ounce of certain noxious weeds present; (e) percentage of germination, with date when test was made; (f) locality of origin of foreign alfalfa, red clover and orchard grass; (g) name and address of vendor.

2. That certain seed shall be exempt from the provisions of the law: (a) When sold for food purposes; (b) when sold for recleaning

or in store for recleaning before ultimate sale; (c) when sold and delivered on the farm when it is grown.

3. That the Station may draw samples from lots exposed for sale, paying the market price for the same and that the samples may be analyzed and the results published together with such other information may be deemed advisable.

4. That citizens may submit samples for analysis and that such analyses shall be made at cost.

5. That a brand tax be assessed against seed vendors, the proceeds to be used in the conduct of the inspection.

6. That, in the event of violation, the facts shall be submitted to the state's attorney of the county in which the alleged violation occurred to the end that prosecution may follow.

The information furnished on the tag attached to the seed sack is sometimes more than the law requires. For example, the "hard seed" content, the "commercial seed" content, the "inert matter" content are sometimes indicated. The seedsmen who furnish this information gratuitously are to be commended for their frankness. The seed buyer may well take this information into account. Hard seeds are usually good seeds but they sometimes germinate so slowly as to reduce the crop yield. "Other crop seed" or "inert matter," if in relatively small quantities, may not be particularly objectionable, but the buyer should remember that he is paying for seed and getting something else, in a way asking for bread and getting a stone.

This law, enacted in 1925 at the instance of the Vermont Farm Bureau Federation, is, except in respect to its revenue provision, essentially the so-called "Uniform Seed Law" devised by the Association of Official Seed Analysts in consultation with the seed trade and in operation in a great many states. It is purely a regulatory measure. It does not assume to dictate what grade of seed shall be offered for sale. Any kind, no matter how poor it is, may be sold, so be it the facts as to its quality are set forth on each package weighing 10 pounds or more, to the end that the buyer may know what he is getting. Its purpose is twofold. Because it is enforced there is greater likelihood that good, clean seed, relatively free from weeds and inert material will be sold and that honest seedsmen will be protected against the practices of dishonest and careless competitors. Obviously the ultimate consumer, the farmer, benefits by its operation; but he may not gain if he does not exercise reasonable precaution, if he fails to see to it

that the retail dealer furnishes him with the information touching the quality of his purchase which he is entitled to receive.

The wholesale seedsman almost invariably complies with the law. The retail dealer does not always do so, usually through inadvertence. He should remember that every package of seed weighing 10 pounds or over which is sold should have attached to it, or written upon it, a copy of the label which the wholesaler attaches to the original package indicating the name of the seed, its purity and viability guaranties and other information. Sales made without such statement are made contrary to law.

The Vermont law does not cover vegetable seed sold in packets or otherwise, although in some states such seed is subjected to inspection. That much packet stuff is not in all respects what it should be is evidenced by the results elsewhere secured. For example, in the adjoining State of New York, after the law had been in operation for some years, the New York (Geneva) Station reports that "all of the seeds sold in this (packet) form by each respective seedsman are approximately of the same quality. . . . The reliable, long-established seed houses in this and other states which sell to New York residents through the mediums of sealed paper packets can usually be trusted, for they make an effort to place in the packets seeds of such quality as will merit the trust placed in them. On the other hand, there are altogether too many seedhouses or dealers, and a study of the results given will indicate who they are, who apparently take no care to determine purity or quality and who sell anything the seed grower or wholesaler will give them, so long as the buying public will accept such goods." No extension of the Vermont seed law to cover package vegetable seed is suggested. The position the Station administration holds is that its duty is to execute the law as it finds it on the statute books rather than to suggest added legislation. However, there seems considerable likelihood that in the absence of adequate protection more or less poor material is being foisted upon the Vermont public.

CONCERNING TOLERANCES AND STANDARDS

The Association of Official Seed Analysts has adopted "tolerances" or allowances for purity and germination tests. Under the best of conditions variations may occur in purity and germination tests as between two samples drawn from the same lot, even though the analyst is well trained and every precaution is exerted. This is due to the fact that seed is not homogeneous in character. Then, too, viability

decreases as the seed ages. Hence it is that seed whose analyses lie within the limits of the following tolerances are not deemed to be seriously misbranded.

The variations allowable in germination tests are: 90 percent or over, 6 percent; 80-90 percent, 7 percent; 70-80 percent, 8 percent; 60-70 percent, 9 percent; 40-60 percent, 10 percent; 30-40 percent, 9 percent; 20-30 percent, 8 percent; 10-20 percent, 7 percent; 0-10 percent, 6 percent.

In determining purity tolerances the sample is held to consist of two parts, namely, the pure seed and that which is not pure seed. The tolerance allowance is 0.2 percent plus 20 percent of the material not pure seed.

The Vermont Station has set up no purity or germination standards. The time does not seem ripe at present to set them up. However, both producers and consumers sometimes seek information as to what are reasonable purity and viability figures for various seeds. It happens that Alabama, Connecticut, Indiana, New York, North Carolina, Oklahoma, Oregon, South Dakota, Tennessee and Virginia have recently established such standards. The following figures, the averages of these 10 standards, are offered for what they are worth. Only seed commonly sown in Vermont are included.

Seed	Purity	Germination	Seed	Purity	Germination
Alfalfa	96	83	Japanese Millet ...	92	86
Alsike Clover	93	78	Oats	98	90
Red Clover	94	85	Field Peas	97	93
Sweet Clover	95	88	Red Top	90	80
White Clover	93	77	Rye	98	90
Field Corn	99	92	Timothy	97	88
Common, German and Hungarian Millets.	94	86			

CONCERNING SEED QUALITY

The seed law, in one form or another, has been upon the Vermont statute books for 20 years. Analytical results have been reported annually in bulletins which are sent without charge to anybody who may ask for them. In the 1930 issue (bulletin 322) the results of 15 years of seed-testing work in Vermont were discussed and comparisons instituted between the conditions obtaining prior to the enactment of the first law in 1912, those obtaining during the existence of the rather toothless law which was replaced by No. 107 of 1925 and those obtaining since that date. It was therein quite clearly shown that while

seed-inspection work is neither spectacular nor pretentious in its character, it notwithstanding serves a very distinct purpose. Thus, for example, a table is printed on page 16 of bulletin 322 which shows how well, or how ill, has been the actual performance of the several seed vendors whose goods have been sold in Vermont since 1915 in respect to the maintenance of the purity guaranties. It is shown therein that 667 purity guaranties were made during the 15 years by a certain concern upon as many lots of seed, samples of which were drawn by the Station sampling agents; that in only 11 instances were these purity guaranties not maintained; and that the percentage of failures was only 1.7, an excellent record. In another instance, 24 similar purity guaranties were made, three of which were not maintained, a 12.5 percent failure record. This table is a significant one and Vermont users of agricultural seed may well study it.

Apparently considerable seed is bought by Vermont farmers from mail-order houses which do not license their goods for sale. Of course, no state law can prevent this type of interstate commerce. Farmers who prefer thus to buy may do so without let or hindrance. However, speaking in general terms, they have a less degree of assurance as to the quality of their purchases than do those who buy the brands sold by seed houses which regularly license their sales and whose output is sampled and analyzed. However, in whatever manner the farmer buys, he should carefully examine the guaranty made in behalf of his proposed purchase. If it is not furnished by the mail-order house or by the local dealer, he should, in his own interests, look askance at the purchase.

Should any farmer feel that the quality of the seed he has bought is not what it was represented to be, he may send a sample to the Station for analysis. In several states much work of this kind is done for their citizens without charge because of state appropriations made to their experiment stations. No such appropriation is made in Vermont and, consequently, the Station can not do this highly desirable class of work without charge. It was on this account that a section was written into the law in 1925 reading as follows:

Sec. 12. *Testing of samples submitted.* A citizen of this state shall have the privilege of submitting to the director samples of agricultural seeds for test and analysis, subject to such rules and regulations as may be adopted by said director who may fix charges for tests of samples thus submitted at a rate not to exceed the actual cost of such tests, and he shall cover all fees received under this section into the state.

The fees assessed necessarily vary according to the nature of the information which is desired by the applicant and the complexity of

the sample submitted. For example, a purity test costs less than a purity and germination test. Then again the analysis of a sample of redtop is a more difficult task than that of a sample of timothy and it costs more to make it. Parties desiring to submit samples for analysis should state the nature of the seed and what it is they desire to learn concerning it and they will be advised as to the charges and also told how to go to work to take accurate samples. Accurate sample taking is vitally important. The results secured on a carelessly taken sample are worse than useless.

Anything which tends to increase the cost of crop production or to reduce crop yields is likely to lessen profits. When poor seed is sown, production costs are apt to be increased or yields reduced or both. This is brought about in several ways as, for example, by sowing seed ill adapted to local climatic conditions, or seed which is immature or has been improperly stored, of low purity content or of impaired viability.

The seed buyer should try to find out the variety he buys and where it is grown. For example, certain kinds of corn do well in southern Illinois but will not mature in Vermont. Alfalfa or clover seed grown in sunny Italy is not fit to sow here. In bygone years much foreign seed was sold to American farmers which proved almost worthless under the climatic conditions existing in the localities where it was sown. It is on this account the Federal seed staining law was enacted some years ago. Foreign seed from sundry sources is stained divers colors indicating its source. Canadian seed, stained violet color, is of course safe to use here.

It has well been said that while animal breeders increasingly are using pure bred the same men who use pure-bred or high-grade Holsteins, Ayrshire, Jerseys, Guernseys will often select an ill-bred and impure grass or clover seed.

Other things being equal, large seed contain more stored food than small seed. Large seed give the young plant a much better start than does smaller seed containing less stored food. The Vermont Station in 1914 published bulletin 177 entitled "Large Seed a Factor in Plant Production." These trials clearly showed a distinct advantage following the use of heavy or large seed; "that a continuous and permanent advantage exists in favor of large seed (since) plants grown from large seed possess more leaves of a greater surface area and hence have greater assimilative powers."

The Ontario Agricultural College compared large and small seed oats during seven years and, on the average, grew 62 bushels per acre from the one and 47 bushels per acre from the other. Both large and small seed were selected from—that is to say, separated from—the same stock and the crops grown under identical conditions. Since the cost of producing the smaller yield was doubtless much the same as that of producing the larger yield, the difference of 15 bushels, 32 percent of the smaller crop, was clear profit.

The farmer should carefully note what it is he is buying and ascertain whether or not the seed he secures is of the quality he desires. He should see to it that his purchases are properly labeled. In particular he should note the date of germination. If the germination test was made six months or more prior to the date he buys, the viability of the seed may be distinctly less than is guaranteed, for seed loses in growing powers as its age increases. Wine and violins improve with age, but this is not so with seed.

Farmers may themselves test the seed they buy as to its germinating powers. The test is easily made and the results secured are fairly accurate. The plate germinator is simply operated. One hundred kernels of corn, oats, wheat, barley, rye or any other grain or 200 seeds of clover or other small seed are placed between two thicknesses of folded blotting paper or cloth (heavy muslin or Canton flannel). Some white blotting papers contain alum or other soluble salts which, being soluble, may delay or even prevent sprouting; hence it is usually better to use cloth. Old newspapers—several of them—are sometimes used. The paper or cloth should be moistened and placed between ordinary tin or china plates and kept in a warm room not too near a window or a stove or a register, where the temperature will range from about 85 degrees during the day to 65 degrees at night. Even temperatures are not desired, but a range that will simulate that of day and night early summer field conditions at the soil surface. Bulletin 205—free for the asking—describes this test in greater detail.

Different sorts of seeds germinate differently. Under favorable conditions moist grass and clover seed begin to sprout in three or four days, but some other seeds are slower in sprouting; hence the tests should be run from 10 days to two weeks. The plates should be examined every two days and records made of the number of seeds sprouted. The paper or cloth should be kept sufficiently moist, but not dripping wet. The number of seeds germinating per 100 gives the percentage of germination.

CONCERNING SEED GROWING

Time was when Vermont farmers grew most of their own seed, but nowadays the practice is less common, except in the case of corn, oats and other grains. Very commonly they can buy to better advantage than they can produce. They are not apt to have the facilities for harvesting and for cleaning and preparing the seed for market and they can not compete successfully with the large growers in more favored localities.

A recent federal publication indicates that only seven percent of the grasses, nine percent of the clovers and alfalfa, and four percent of the millets are home grown in the Eastern States, whereas 56 percent of the small grain seed is locally produced there. These figures are smaller in the first four instances and larger in the latter instance than those pertaining to any other section from the Atlantic to the Pacific.

Although small seed growing is not a factor in Vermont, it may be of interest to seed users to know something as to the way in which the seed they buy is secured. Farmers' bulletin 1232, issued by United States Department of Agriculture at Washington (which may be secured without charge on application to either senator or congressman) discusses the processes in full. It may be said, in brief, that the seed grower in preparing seed for market first thrashes it, and after a fashion, sometimes well sometimes ill, cleanses it and then sacks it for sale. The average cleansing at the point of production rarely does more than simply to remove dirt, chaff, and the larger weed and foreign seeds. Hence the seedsman, before selling, almost invariably recleans his purchases. It would be quite out of the question for an individual farmer to maintain the battery of cleansing machines that are operated by the seedsmen, although possibly several farmers might combine for this purpose.

In the regions where seed is largely grown, many sales are made to neighbors and to other farmers. These commonly account for more than 50 percent of the total seed grown, the residue being sold to local shippers, to traveling seed buyers or to distant seedsmen.

Seed grains in general are produced in the northwestern, central and southwestern states and in the North Pacific states. Grass and clover seeds are grown in surplus quantities mostly in the central states and in a few states west of the Rockies. Alfalfa seed is mainly grown in regions west of the Mississippi River; redtop largely in southern Illinois; millets from Illinois west to eastern Colorado and

south into Oklahoma and Texas; Sudan grass in Kansas, Oklahoma and Texas; field peas in Michigan, Wisconsin, Washington, Idaho, Montana; soy beans throughout the South from North Carolina to Mississippi and Tennessee, and to some extent in Indiana.