GRADING, PACKING AND STOWING FLORIDA PRODUCE

By M. R. Ensign

Fig. 1.—A light weight container that carries, protects and displays the product to excellent advantage is desirable for Florida produce.

Bulletins will be sent free upon application to the
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By M. R. ENSIGN

The majority of the vegetable and fruit growers of Florida have never had an opportunity to observe the handling of perishable produce at the large markets of the country. Since they are normally occupied with the details of production, frequently they have rather meager information regarding some of the modern methods employed and how these methods may affect them. Too few realize that the horticultural industry of Florida is suffering an economic loss of millions of dollars annually due to poorly graded produce packed in ill-adapted packages and carelessly stowed in cars. It seems desirable, therefore, to present to the growers some of the facts recently secured at two large terminal markets, in the hope that such information may point the way to more successful merchandizing of their produce.

HISTORY

Florida vegetable growers, some 30 years ago, introduced some of the first field-grown produce onto Northern markets during the winter and early spring months. Up until the freeze of 1895, the chief horticultural endeavor had been in the culture of citrus fruits. This freeze severely curtailed citrus production for a period of years and turned the people's attention toward vegetable growing. At that time the demand was strong for all kinds of produce, since the supply during our shipping season was very limited. At the inception of the truck industry little consideration was given to grading, packing or packages, since nearly anything brought a fair price regardless of appearance or quality. Today an entirely different situation exists. Not only has the acreage devoted to vegetables within the state increased enormously during the past 10 years but other areas in California, Texas, Louisiana and other Southern states have become keen competitors.* In addition to these, considerable quantities of potatoes, tomatoes and other vegetables are imported each year from Mexico, Cuba and other West Indian Islands. As frequently happens, these new areas introduced new and better varieties together with closer grading and more attractive packages in an effort to capture the markets, while Florida with an established market did not realize the necessity of similar improvements. As a result, Florida has suffered severely and in some cases disastrously.

Data have been collected from time to time in an effort to classify accurately the different reasons for the apparent decline in popularity of Florida produce. All of these have indicated the importance of correct methods of grading and packing, two items that have received relatively little attention in Florida. To corroborate these findings, brief studies were made on two of the largest markets, New York and Philadelphia.** While these are not extensive enough to determine exactly the relative importance of the various factors involved, they clearly show that Florida produce is not graded closely enough or packed properly in the majority of cases. While further investigations will be carried on, it is deemed wise to bring to the attention of the growers the outstanding facts found in these investigations. The data are admittedly incomplete but they tell a definite story and the photographs show specifically the conditions found.

The vegetable industry of Florida is suffering severely on account of inter-state and foreign competition. In Table I data are presented to show the average annual trends in total car-lot shipments from Florida and from competing areas. These data are for 10 leading truck crops and are given on a percentage basis.

Of the 10 crops included in this study, only three show a favorable balance for Florida, namely, string beans, cabbage and peppers.

**TABLE I.—AVERAGE YEARLY CHANGES IN CARLOAD SHIPMENTS OF FLORIDA VEGETABLE CROPS AND FROM COMPETING AREAS, INCLUDING FOREIGN COUNTRIES, FROM 1925 TO 1931.*

<table>
<thead>
<tr>
<th>Crop</th>
<th>Average yearly change (percent)</th>
<th>Foreign</th>
<th>Stored</th>
</tr>
</thead>
<tbody>
<tr>
<td>String beans</td>
<td>+ 18.4</td>
<td>+ 14.6</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>+ 13.6</td>
<td>- 0.5</td>
<td>- 4.4</td>
</tr>
<tr>
<td>Celery</td>
<td>+ 6.1</td>
<td>+ 13.5</td>
<td></td>
</tr>
<tr>
<td>Cucumbers</td>
<td>- 5.9</td>
<td>+ 5.1</td>
<td></td>
</tr>
<tr>
<td>Eggplant</td>
<td>+ 2.9</td>
<td>+ 18.5</td>
<td></td>
</tr>
<tr>
<td>Peppers</td>
<td>+ 20.4</td>
<td>- 7.3</td>
<td></td>
</tr>
<tr>
<td>Lettuce</td>
<td>- 11.0</td>
<td>+ 5.7</td>
<td></td>
</tr>
<tr>
<td>Potatoes, white</td>
<td>+ 3.0</td>
<td>+ 7.6</td>
<td>- 11.1</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>- 1.1</td>
<td>+ 8.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Watermelons</td>
<td>+ 4.6</td>
<td>+ 4.5</td>
<td></td>
</tr>
<tr>
<td>Mean gain per year</td>
<td>5.0</td>
<td>7.8</td>
<td></td>
</tr>
</tbody>
</table>

Note: The + and - signs indicate whether the change in production has been above or below the average for the 7-year period.


**Just as this publication goes to press, J. W. Lloyd and H. M. Newell report similar studies made at the Chicago Terminal in University of Illinois Agr. Exp. Station Bul. 379. The conclusions based upon these studies point out many of the same types of damage to produce upon arrival at that market as found at New York and Philadelphia.
pers. The increase in string bean shipments is due largely to the reclamation of the muck soils of the Everglades where beans are produced in large quantities. The pepper business seems to show little competition. The data regarding cabbage are somewhat misleading, since they do not show all the facts. These will be examined later.

Fig. 2.—Annual shipments (thousands of carloads) of tomatoes from Florida and from competing areas, 1925 to 1931.
The crop showing the greatest decline is lettuce. This loss to the vegetable industry of Florida amounts to millions of dollars annually, and was due to the introduction of the Iceberg type of lettuce which Florida has been unable to grow successfully. While varietal problems do not directly bear upon the question of grading and packing, they do have an indirect relationship of great significance, since quality and uniformity of produce are cardinal principles of successful marketing. Varieties must show a clear adaptation to the region in which they are produced if these qualities are realized. The introduction and the creation of strains and varieties adapted to a region and having the qualities which the trade demands is obviously fundamental to the success of the vegetable industry, irrespective of high standards of grading and packing. Obviously, if vegetables of high quality and uniformity cannot be produced, they cannot be packed.

The figures on the movement of tomatoes from Florida, as shown in Fig. 2, are somewhat surprising. One partial explanation for the decided decline in shipments from 1927 may be found in the unfavorable weather conditions persisting, particularly over the lower East Coast area, during most of this time. With the introduction of the Marglobe variety, the quality of Florida tomatoes was greatly improved, and this has had a stabilizing effect upon the industry in spite of weather handicaps, real estate inflations, economic depressions and keen competition. The increase in foreign competition alone has been 11.4 percent per year, as indicated in Table I, for the 7 years studied, while that from competing areas has been nearly three-fourths as great.

Celery and cucumbers both show an unfavorable balance for Florida. Poor grading and packing, together with inferior quality, seem to be the most important issues involved.

The trends in the Irish potato shipments are presented graphically in Fig. 3 and show that shipments from competing areas have been increasing slightly more than twice as fast, on the average, as those from Florida. A considerable portion of this increase is due to the large quantities of Northern grown potatoes that are still in storage at the time of Florida's shipping season. (Table I.)

The above comparisons are made for a relatively short period of time. The same picture of the relative volume of cabbage production as shown in Table I, for instance, is not obtained when the acreage devoted to this crop since 1916 in Texas is compared with that in Florida over the same time, as shown in Fig. 4. Florida in 1916 had a large potential market for the expansion
of her cabbage industry. Competing areas have taken advantage of the opportunity. This fact is further demonstrated in Fig. 5 where the shipments of cabbage in hundreds of cars by months are shown as averages for the years 1924, '25 and '26.

Geographically, Florida is advantageously located, so far as proximity to the large centers of consumption is concerned. Con-

Fig. 3.—Annual shipments (thousands of carloads) of white potatoes from Florida (below) and from all other competing areas, 1924 to 1931 inclusive.
sidering transportation costs and quickness of delivery, this favorable location should make Florida cabbage a favorite in the markets of the Southeastern and Eastern states. That this is not the case, however, is clearly shown by the figures in Table II.

### Table II.—Receipts of Florida and Texas Cabbage, by Car, in 14 Markets During Past Four Years.

<table>
<thead>
<tr>
<th>Place</th>
<th>1927 Texas</th>
<th>1928 Florida</th>
<th>1928 Texas</th>
<th>1929 Florida</th>
<th>1929 Texas</th>
<th>1930 Florida</th>
<th>1930 Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akron</td>
<td>..</td>
<td>14</td>
<td>..</td>
<td>20</td>
<td>..</td>
<td>21</td>
<td>..</td>
</tr>
<tr>
<td>Atlanta</td>
<td>76</td>
<td>42</td>
<td>75</td>
<td>19</td>
<td>130</td>
<td>27</td>
<td>46</td>
</tr>
<tr>
<td>Baltimore</td>
<td>54</td>
<td>130</td>
<td>30</td>
<td>167</td>
<td>51</td>
<td>174</td>
<td>21</td>
</tr>
<tr>
<td>Birmingham</td>
<td>119</td>
<td>111</td>
<td>..</td>
<td>179</td>
<td>..</td>
<td>167</td>
<td>4</td>
</tr>
<tr>
<td>Boston</td>
<td>170</td>
<td>63</td>
<td>138</td>
<td>26</td>
<td>237</td>
<td>59</td>
<td>166</td>
</tr>
<tr>
<td>Buffalo</td>
<td>38</td>
<td>34</td>
<td>50</td>
<td>7</td>
<td>68</td>
<td>13</td>
<td>44</td>
</tr>
<tr>
<td>Chicago</td>
<td>553</td>
<td>16</td>
<td>629</td>
<td>9</td>
<td>744</td>
<td>16</td>
<td>505</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>119</td>
<td>23</td>
<td>83</td>
<td>2</td>
<td>110</td>
<td>8</td>
<td>198</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>1</td>
<td>..</td>
<td>1</td>
<td>..</td>
<td>4</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Nashville</td>
<td>10</td>
<td>..</td>
<td>76</td>
<td>1</td>
<td>89</td>
<td>..</td>
<td>54</td>
</tr>
<tr>
<td>New York</td>
<td>116</td>
<td>701</td>
<td>177</td>
<td>518</td>
<td>378</td>
<td>741</td>
<td>203</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>15</td>
<td>345</td>
<td>218</td>
<td>217</td>
<td>291</td>
<td>180</td>
<td>142</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>277</td>
<td>13</td>
<td>162</td>
<td>1</td>
<td>167</td>
<td>1</td>
<td>195</td>
</tr>
<tr>
<td>Richmond</td>
<td>..</td>
<td>13</td>
<td>26</td>
<td>29</td>
<td>39</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,647</td>
<td>1,397</td>
<td>1,376</td>
<td>995</td>
<td>2,394</td>
<td>1,271</td>
<td>1,782</td>
</tr>
</tbody>
</table>

*Note: A freeze in January practically stopped shipments for the remainder of the shipping season.*

### Table III.—Price Comparisons for Florida and Texas Cabbage on 6 Markets on 8 Different Days.

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Fla. (1½-bu. hampers)</th>
<th>Texas (2½ bu. states)</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Per pkg.</td>
<td>Per ton</td>
<td></td>
</tr>
<tr>
<td>12-22-31</td>
<td>Philadelphia</td>
<td>$1.30</td>
<td>$37.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New York</td>
<td>1.00</td>
<td>28.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pittsburgh</td>
<td>1.25</td>
<td>35.71</td>
<td></td>
</tr>
<tr>
<td>12-17-31</td>
<td>New York</td>
<td>1.50</td>
<td>42.85</td>
<td>2.75</td>
</tr>
<tr>
<td>12-24-31</td>
<td>Chicago</td>
<td>1.50</td>
<td>42.85</td>
<td>1.87</td>
</tr>
<tr>
<td>12-28-31</td>
<td>Cleveland</td>
<td>1.50</td>
<td>42.85</td>
<td>2.35</td>
</tr>
<tr>
<td>12-30-31</td>
<td>New York</td>
<td>1.50</td>
<td>42.85</td>
<td>2.12</td>
</tr>
<tr>
<td>1-6-32</td>
<td>Pittsburgh</td>
<td>1.50</td>
<td>38.57</td>
<td>2.12</td>
</tr>
<tr>
<td>1-6-32</td>
<td>Chicago</td>
<td>1.75</td>
<td>50.00</td>
<td>2.75</td>
</tr>
<tr>
<td>1-6-32</td>
<td>New York</td>
<td>1.50</td>
<td>42.85</td>
<td>2.75</td>
</tr>
<tr>
<td>1-6-32</td>
<td>Chicago</td>
<td>1.57</td>
<td>39.14</td>
<td>2.42</td>
</tr>
<tr>
<td></td>
<td>Boston</td>
<td>1.57</td>
<td>44.21</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td>..</td>
<td>1.87</td>
<td>53.40</td>
<td></td>
</tr>
<tr>
<td>12-30-31</td>
<td>Cleveland</td>
<td>1.37</td>
<td>39.14</td>
<td>2.25</td>
</tr>
<tr>
<td>2-15-32</td>
<td>New York</td>
<td>1.31</td>
<td>37.43</td>
<td>2.62</td>
</tr>
<tr>
<td>2-17-32</td>
<td>..</td>
<td>1.07</td>
<td>30.57</td>
<td>2.50</td>
</tr>
</tbody>
</table>

Mean of 15 quotations: 1.96 12.00 2.41 48.20 100 24
The total carloads of cabbage unloaded in 14 Eastern markets from Texas and from Florida for each year from 1927 to 1930, inclusive, are shown. For such close markets as Birmingham, Atlanta, Nashville and Cincinnati, the decided preference shown for Texas cabbage, in spite of freight charges of $2 to $6 more per ton, shows that something is radically wrong.

When comparisons are made of prices received for Florida and Texas cabbage the inequalities are further emphasized. Such a comparison is shown in Table III. Six different markets on eight different days are included.

On account of the difference in the size and type of package used by Texas and Florida growers, the only satisfactory basis for a
price comparison was the rate paid per ton. Ten to 20 packages per car from a number of cars from the two areas were weighed. On this basis the weight of Texas cabbage per crate was near 100 pounds on the average, while the Florida product weighed less than 70 pounds per hamper. Some compensation was made in the weights of Florida cabbage used in the computations because the heads were unusually light in the season of 1931-32 on account

![Figure 5](image-url)

Fig. 5.—This graph shows clearly the competition which Florida faces on the markets from various early cabbage producing areas. The principal one, of course, is Texas. Note the large increase in shipments from Texas during February, March and April, and from other Southern states during April and May. Average shipments for the years 1924, 1925 and 1926. (Courtesy Bur. of Railway Economics.)
of drought and warm weather. The weights indicated above were therefore used to determine the price per ton.

The average price paid for the Texas cabbage is thus seen to exceed that paid for the Florida product by approximately 25 percent. While the data are too few to do more than indicate a condition, they emphasize the necessity for further studies in this connection.

For instance, there is but one case where both the pointed and round type from Florida are quoted on the same market. The latter sold at a premium of $8.50 per ton if we admit the same weight of cabbage, which is probably not the case. The round type is the heavier, so that if correction for this were made, the difference would be less important. Furthermore, it is interesting

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Fig. 6.—Pointed head cabbage packed in 1½ bushel hamper. Note the lack of uniformity in size and trimming. Heads at extreme left badly crushed on account of bulge pack. Compare this with Fig. 7.

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Fig. 7.—Round type cabbage packed in 2³⁄₄ bu. Western lettuce crate. This lot was selected at random to compare with that shown in Fig. 6. It was put up in a packinghouse. Note the uniform size and trimming.
to note that the round type from Texas sold for a few dollars per ton more than the same type from Florida on the same market. A comparison between the Florida and Texas cabbage as it appears on the market may be seen by examining Figs. 6 and 7 which show typical samples. The Texas cabbage was graded and packed in a packinghouse, the Florida product was indifferently graded and packed in the field. Table IV shows the chief differences between the cabbage coming from these two areas.

**TABLE IV.—THE CHIEF DIFFERENCES BETWEEN FLORIDA AND TEXAS CABBAGE AS IT GOES ON THE MARKET.**

<table>
<thead>
<tr>
<th>Variable characteristics</th>
<th>Florida</th>
<th>Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Pointed heads, not so firm</td>
<td>Round heads, very firm</td>
</tr>
<tr>
<td>Grade</td>
<td>Field run, lack uniformity</td>
<td>Standard grades, uniform, put up in packinghouse</td>
</tr>
<tr>
<td>Trimming</td>
<td>Not closely or consistently trimmed</td>
<td>Closely trimmed</td>
</tr>
<tr>
<td>Package</td>
<td>1¼ bushel hamper</td>
<td>2¼ bushel slat crate</td>
</tr>
<tr>
<td>Weight (actual)</td>
<td>About 70 lbs.</td>
<td>About 100 lbs.</td>
</tr>
<tr>
<td>Billed weights</td>
<td>56.7 lbs.</td>
<td>85 lbs.</td>
</tr>
<tr>
<td>General appearance</td>
<td>Poor</td>
<td>Good</td>
</tr>
</tbody>
</table>

To determine the relative importance of the various items listed above, more detailed information must be secured. Here again the question of variety or type asserts itself, yet the importance of proper grading, packing and general appearance cannot be overlooked.

All the facts presented above with respect to the trends in production of truck crops from Florida and their reception on the markets rather forcefully indicate an unfavorable condition, no small part of which is due to the continued use of obsolete methods of grading and packing. Such facts do not argue for an increased and profitable vegetable industry for Florida.

**GRADING AND PACKING**

By the term "grading" is meant that operation whereby an effort is made to group together the fruits or vegetables of the same variety that most nearly resemble each other as to shape, size, color, ripeness and quality. There are several reasons why grading is such an important step in successful marketing:

1. **Graded produce** has a much more attractive appearance than a miscellaneous collection. The appeal through the eye largely determines whether or not a sale is made and also governs, to a large extent, the price offered. Figures 6 and 7 show this rather forcefully. It is especially important that Florida vegetables be
carefully graded, since the climate and soil conditions under which they are grown are conducive to wide variations and, in addition, there are the inherent variations incident to the planting of numerous strains and varieties. In many cases Florida crops have been so poorly trimmed and washed that these operations have had to be repeated before sales to retail stores are attempted, and all this expense is charged back to the producer. The necessity of establishing and maintaining a reputation for high-grade produce should not be overlooked.

2. Grades that are fully standardized and enjoy a good reputation provide a basis upon which buying and selling can be done by wire. This facilitates the better distribution of goods, since inspection is not necessary. Many cars of graded produce are sold by telephone or telegram while they are rolling.

3. Certain markets require No. 1 grades while others take only second or third grade produce. Grading makes it possible to supply such demands.

4. Ungraded produce not only brings a low price in competition with graded goods, but frequently demoralizes an otherwise stable market. Careful grading prevents the expense of packing and shipping inferior produce which serves only to glut the market.

5. Grading provides a basis for shipping point inspection.

In view of the foregoing reasons for standardized grading, the Florida Legislature of 1927 enacted the following Act, which provided:

**FLORIDA STATE GRADING ACT**

Section 1. That the standard grades of all fruits and vegetables shall be the same as those of the United States grades as now promulgated or which may be promulgated by the United States Department of Agriculture.

Section 2. That the Florida State Marketing Bureau, cooperating with the United States Department of Agriculture, shall, when requested by the shipper, furnish carlot inspection of fruits and vegetables at shipping point, furnishing certificates in conformity with those used by the United States Department of Agriculture in shipping point inspection, provided the expense or charge of such inspection shall be paid by the shipper.

Section 3. That all fees for inspection shall be paid to the State Marketing Commissioner, who shall deposit same in a fund to be known as the Cooperative Inspection Fund, and all expenses for inspection service shall be paid from said fund upon the approval and at the direction of the State Marketing Commissioner.

Section 4. That all such cooperative Government certificates shall be accepted as prima facie evidence in the courts of Florida.

Section 5. That the State Marketing Commissioner shall employ such assistants as are necessary to carry out the provisions of this Act.

Section 6. That all laws or parts of laws in conflict with this Act be and the same are hereby repealed.

Section 7. That this Act shall take effect upon its becoming a law.

This Act became a law so that shipping point inspection is now available to any group of growers where vegetables or fruits are
shipped in quantity.* Some of the advantages of this service follow:

1. Assists in maintaining a good grade and pack while the commodity is still under the control of the packinghouse manager.
2. Aids to a great extent in maintaining a uniform grade and pack.
3. Describes the quality of the commodity so that selling organizations may more intelligently market it.
4. Creates more confidence among growers when several are loading together or when pooling.
5. Assists in the settlement of claims.
6. Assists in settling disputes between seller and buyer. Certificates cover the following points:
   - Condition of Car and Equipment.
   - Condition of Load and Containers.
   - Pack.
   - Size.
   - Maturity; Color.
   - Quality and Condition.
   - Grade.

The duties of the inspectors are not merely to issue these certificates but to assist the shipper or grower in every way possible to meet and maintain the grade and pack.

The certificates issued by these inspectors are accepted as Prima Facie Evidence in the Courts of Florida and since the service is under Federal Supervision has this same standing in the Federal Courts. Other states are also providing by law that the certificates shall be accepted as Prima Facie Evidence in their courts.

It is readily apparent that such shipping point inspection service is based upon standard grades and packs. The definition of the various grades and tolerances for the chief vegetable crops are given in the appendix.

METHODS OF PACKING AND GRADING

There are two possible classifications in considering the methods of grading and packing: (1) the place of grading, i.e., whether in the field or packinghouse; (2) the height of the pack, i.e., whether flat or bulge. These are considered in turn.

Most of the cabbage, beans, lettuce, beets, carrots and potatoes shipped out of Florida are field graded and packed. These vegetables cannot be graded properly by the laborer in the field but should be graded in a packinghouse by skilled labor. There is a decided preference shown on the markets for well trimmed and washed vegetables. In recent years especially adapted machinery has been designed to wash such crops as celery, potatoes, beets, and carrots. Some of these machines are now in operation in some of the producing areas of the state, and are proving very

*Application for such service should be made to the State Marketing Bureau, Jacksonville, Fla.
**Excerpt from statement by O. G. Strauss, Federal Supervisor in Charge, Orlando, Fla.
satisfactory, not only from the standpoint of efficiency but from
the increased price which washed produce brings. A considerable
portion of celery is still field-packed, although washing and pre-
cooling practices are on the increase.

The packing shed need not be an expensive structure and the
equipment is simple. Plenty of light and ventilation, provision
for the easy and rapid movement of the produce through the house
and plenty of grading bins are the chief requirements. Space for
the storage and assembling of containers may be made a part of
such a structure. Adequate supervision of the grading and pack-
ing is, of course, essential, but even this is not necessarily a costly
service and with proper care the entire packing costs can be kept
very low.

During the past 10 years a marked change has taken place with
respect to the height of pack used in both vegetable and fruit
containers. The original intent of the slightly bulged pack was
to prevent a loose pack at destination due to shrinkage. This was
the argument advanced especially in the case of oranges. But
certain growers conceived the idea of overpacking their containers
as a direct bid for the buyers' attention on a highly competitive
market. A typical example of such effort is shown in the follow-
ing advertisement:

"----- Brand lettuce heads are carefully sized for uniformity and
to secure the maximum number of salable heads per crate. Then every
crate is deliberately overpacked to a point where lidding under heavy
pressure is required. This means more heads per crate of salable
lettuce."

This procedure was naturally encouraged and eventually de-
manded by the buyers, so that an ever-increasing height of bulge
has resulted. In Fig. 8 is shown the condition of cabbage as it
arrived at the market in overfull or bulge-packed crates. In
Table V is shown the upward trend in the amount of lettuce packed
in crates from 1922 to 1930, an increase of approximately 23
pounds per crate.

In connection with these investigations, 20 packages of Western
lettuce were weighed in February, 1932, at the New York Ter-

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight, lbs.</th>
<th>Year</th>
<th>Weight, lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922</td>
<td>84.8</td>
<td>1927</td>
<td>95.6</td>
</tr>
<tr>
<td>1923</td>
<td>86.8</td>
<td>1928</td>
<td>97.1</td>
</tr>
<tr>
<td>1924</td>
<td>88.5</td>
<td>1929</td>
<td>100.4</td>
</tr>
<tr>
<td>1925</td>
<td>92.7</td>
<td>1930</td>
<td>107.0(estimated)</td>
</tr>
<tr>
<td>1926</td>
<td>93.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Florida Agricultural Experiment Station

Fig. 8.—Hampers overfilled with cabbage cannot be loaded in the approved method, but must be loaded on their sides. Note the mis-shapen packages and very unattractive appearance that results when the hampers are unloaded. The heads that protrude above the tops of the hampers often are badly torn and bruised.

They ranged from 109 to 133 pounds, with an average of 125.3 pounds per package, gross weight. Some idea of the height of the bulge on such crates may be had by examining Figs. 9, 10, 11, 12 and 29. The package used for Western lettuce was designed to carry about 75 pounds, so that the average container, based upon the above weights, was actually overpacked about 60 percent by weight. The same tendency was found to apply to practically all commodities examined at this time. The results of these examinations are found in Table VI.

The table shows both hampers and crates of cabbage, celery, peppers, lettuce and citrus to be overpacked, with a considerable breakage of containers. Some of the reasons for this breakage that were most apparent are given in the table.
Fig. 9.—Heavy chunk icing was partly responsible for some breakage in this car of peas. Note the very high bulge. When the paper lining tore, the peas sifted out.

Fig. 10.—Broken containers of Savoy cabbage on the pier. Frequently this condition is what is meant when your commission merchant informs you that your produce "arrived in bad condition." The produce actually was not damaged to any appreciable extent, but the condition creates a bad psychological effect upon the receivers or buyers.
<table>
<thead>
<tr>
<th>Car No.</th>
<th>Shipping point</th>
<th>Commodity</th>
<th>Type or variety</th>
<th>No. pkgs. per car</th>
<th>No. broken pkgs.</th>
<th>Height of bulge</th>
<th>Avg. excess wt. per pkg.</th>
<th>Reasons for breakage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20663</td>
<td>Texas</td>
<td>Cabbage</td>
<td>Copenhagen</td>
<td>320</td>
<td>53</td>
<td>3 3/4&quot;</td>
<td>15.3</td>
<td>Excessive bulge</td>
</tr>
<tr>
<td>51112</td>
<td>Florida</td>
<td>&quot;</td>
<td>Wakefield</td>
<td>424</td>
<td>48 loose tops</td>
<td>4-5&quot;</td>
<td>7.6</td>
<td>Poor container</td>
</tr>
<tr>
<td>33769</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>440</td>
<td>33</td>
<td>6-7&quot;</td>
<td>6.7</td>
<td>Excessive bulge</td>
</tr>
<tr>
<td>15611</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>315</td>
<td>93</td>
<td>5&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>20285</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>320</td>
<td>51</td>
<td>5 3/4&quot;</td>
<td>6.8</td>
<td>Loose load; impact</td>
</tr>
<tr>
<td>78477</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>450</td>
<td>45</td>
<td>6-7&quot;</td>
<td>-8.2</td>
<td>&quot;</td>
</tr>
<tr>
<td>31842</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>424</td>
<td>7</td>
<td>4-5&quot;</td>
<td>16.2</td>
<td>Excessive bulge</td>
</tr>
<tr>
<td>29730</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>320</td>
<td>56</td>
<td>3-5&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>26800</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>315</td>
<td>27</td>
<td>3-5&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>62357</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>450</td>
<td>22</td>
<td>3-6&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>52263</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>440</td>
<td>27</td>
<td>3-6&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>25547</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>227</td>
<td>2</td>
<td>3-5&quot;</td>
<td>&quot;</td>
<td>Slats pushed in at top</td>
</tr>
<tr>
<td>65647</td>
<td>&quot;</td>
<td>Celeroy</td>
<td>&quot;</td>
<td>384</td>
<td>11</td>
<td>Slight</td>
<td>&quot;</td>
<td>Poor nailing</td>
</tr>
<tr>
<td>20245</td>
<td>California</td>
<td>&quot;</td>
<td>&quot;</td>
<td>340</td>
<td>1</td>
<td>None</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>87418</td>
<td>&quot;</td>
<td>Beans</td>
<td>&quot;</td>
<td>637</td>
<td>14</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Hamper wire pulled out</td>
</tr>
<tr>
<td>63251</td>
<td>&quot;</td>
<td>Peppers</td>
<td>&quot;</td>
<td>430</td>
<td>8</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Top off—poor nailing</td>
</tr>
<tr>
<td>57710</td>
<td>So. Carolina</td>
<td>Radishes</td>
<td>&quot;</td>
<td>609</td>
<td>86</td>
<td>3 3/4&quot;</td>
<td>49.3</td>
<td>Poor nailing and no bracing</td>
</tr>
<tr>
<td>50212</td>
<td>California</td>
<td>Lettuce</td>
<td>&quot;</td>
<td>318</td>
<td>57</td>
<td>3 3/4&quot;</td>
<td>&quot;</td>
<td>Bulge</td>
</tr>
<tr>
<td>19054</td>
<td>&quot;</td>
<td>Tangerines</td>
<td>30 trial shipment of 30 crates</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>No re-coops</td>
</tr>
<tr>
<td>31719</td>
<td>&quot;</td>
<td>Tangerines</td>
<td>&quot;</td>
<td>349</td>
<td>0</td>
<td>0</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>74883</td>
<td>&quot;</td>
<td>Oranges</td>
<td>&quot;</td>
<td>360</td>
<td>33</td>
<td>8.6</td>
<td>&quot;</td>
<td>Excessive bulge</td>
</tr>
</tbody>
</table>
The evidence then seems to indicate that the bulge pack has assumed such proportions in the produce business that grave economic losses are directly or indirectly attributable to its use. Consider, for example, the amount of produce which the grower gives as a premium to attract the buyer to his product. Let us assume that he has 12 carloads of 400 packages each and these are overpacked 25 percent by weight. He virtually furnishes the buyer three cars of produce gratis. Of course, this would not be a net profit to the grower for freight charges* would have to be deducted as well as package and selling costs on these three cars.

The chief concern of the grower, however, should be in the serious consequences which develop as a result of the high bulge pack. These may be considered under two main heads: (1) the damage inflicted upon the produce itself, due to too great pressure,

*But the railroads are not unmindful of the freight that they have been hauling gratis, due to the overfull or bulge pack. They are asking for new billing weights based upon the weight of the bulge pack containers.
and (2) the breakage of the containers. These will be considered in the order given.

Camp** has pointed out that grapefruit in bulge pack held in cold storage for 30 days showed a deterioration of the fruits where they were flattened by compression. Fifield*** found the same for oranges. The tissue underneath the point of compression seemed to break down and dry out, making the fruit unsalable. This condition is shown in Fig. 12.

![Figure 12](image)

Fig. 12.—Cross-section of Marsh Seedless grapefruit from cold storage experiments, showing internal breaking down due to pressure in packing. (From Ann. Rept. 1931.)

An initial test on the effects of the bulge pack on the keeping and ripening of tomatoes under conditions comparable to those in transit and subsequent storage shows that 53.4% of the fruit by weight was lost by crushing and decay in the usual bulge pack in contrast to 36.7% loss in a flat pack, other factors being the same.

The "usual" bulge is shown in Fig. 13 and one of the types of injury incident to compression in such a bulge pack is shown in Fig. 14.

Where crushed ice is used in the containers, the bulge pack seems to be directly responsible for the laceration and bruising of the plant tissue by the sharp ice particles. Such produce, especially lettuce, has been observed to rot and deteriorate very rapidly when removed from the packages out of refrigeration.

The evidence shows, therefore, that when any produce such as

---

Fig. 13.—Over-full tomato lugs just loaded in car. This is not regarded as a high bulge, yet the pressure necessary in nailing on the covers and placing the car strips has distorted the shapes of a large percentage of the tomatoes in this car. This means ruptured tissues that will "leak" when the tomatoes begin ripening.

Fig. 14. Tomatoes showing typical injury due to compression in bulge pack. (Courtesy U. S. D. A.)
pomaceous fruits, grapes, citrus and even green tomatoes are subjected to the great pressure usually necessary in the creation of a bulge pack and the nailing on of the lids; that when such compressed produce remains under this pressure for a period of days, the plant tissues are badly bruised, distorted and ruptured. Such goods are, therefore, subject to discount, damage-claim payments or entire rejection on the part of the receiver. The losses and costs thus accruing are passed to the grower.

There is another angle to the question of bulge packs that warrants some attention. This investigation shows that with the growing demand on the part of the buyers for a higher and higher bulge there has developed among certain shippers what may be termed a “false pack.” This has taken two forms. In certain containers such as the double space citrus crate the center partition has been raised so that it, rather than the fruit, takes the pressure of the bulging lid. In the other case, the appearance of a high bulge is given by pyramiding the fruit or vegetables in the container. In this case no more produce is put into each container than with the flat pack and in some cases the net weight of the

Fig. 15.—On account of the bulge pack, these boxes of oranges could not be loaded in the most approved fashion, but had to be set up end on end. The covers are about 1 inch longer than the boxes. The height of the bulge was not quite great enough to take up this excess length of cover. As a result, the cover and not the box took the weight of the boxes and the load above, forcing off the covers. The nails sheared through the cleats.
contents was less than that of an ordinary flat pack. But the pyramiding of the contents in the latter case subjected the produce to the same pressure as in the true bulge pack.

In Table VI the number of broken packages in the car of produce observed at the New York Pier No. 28 are indicated, together with some of the most obvious reasons therefor. The bulge pack is responsible for the majority of broken packages, yet there are other causes.

As the car doors are opened to be unloaded at these markets, anyone not familiar with the conditions rather expects to see the produce in the orderly arrangement in which it started out from the shipping point. But, after inspecting a considerable number of cars, such an observer begins to realize that the number of cars arriving with little or no breakage is quite small. Some typical examples of the appearance of the produce as the cars are opened are shown in Figs. 8, 9, 15, 16, 17, 18, and 23.

Fig. 16.—Damage claims for this shipment were instituted against the railroad company on the grounds of "impact" damage. There is every evidence of impact, but the whole trouble was a loose load to begin with.

At Pier 28, New York, an accurate count of all broken packages in each car is made by the foreman who checks the total number of packages from each car. A compilation of these data is shown in Table VII giving the number of cars of fruits and vegetables arriving each month and the total number of packages per month that arrived in a broken condition. These latter figures have been converted into equivalent cars using 400 packages as constituting
Fig. 17.—Florida celery in the car showing broken packages due to faulty nailing and bulge pack. Note how the leaves are crushed by the upper crates, thus injuring the appearance of the product.

an average carload. The percentage of cars of broken packages for vegetables and fruits are shown in the last two columns. The data cover a period of 13 months from January, 1930, to January, 1931, inclusive.

TABLE VII.—MONTHLY ARRIVALS OF CARLOADS OF FRUITS AND VEGETABLES SHOWING NUMBER OF BROKEN PACKAGES AT PIER 28, NEW YORK CITY.

<table>
<thead>
<tr>
<th>Month</th>
<th>November</th>
<th>December</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable</td>
<td>2,692</td>
<td>2,600</td>
<td>5,292</td>
</tr>
<tr>
<td>Fruit</td>
<td>30,260</td>
<td>9,200</td>
<td>39,460</td>
</tr>
<tr>
<td>Broken Pkgs</td>
<td>15,150</td>
<td>37,283</td>
<td>52,433</td>
</tr>
<tr>
<td>Broken Packages</td>
<td>76.0</td>
<td>82.2</td>
<td>80.3</td>
</tr>
<tr>
<td>% in Equivalent Carloads</td>
<td>2.82</td>
<td>5.89</td>
<td>4.05</td>
</tr>
</tbody>
</table>

1931

<table>
<thead>
<tr>
<th>Month</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veg.</td>
<td>2,692</td>
<td>3,113</td>
<td>3,764</td>
<td>4,664</td>
<td>6,107</td>
<td>6,214</td>
<td>2,840</td>
<td>787</td>
<td>6,107</td>
<td>1,086</td>
<td>1,727</td>
<td>2,808</td>
<td>2,927</td>
</tr>
<tr>
<td>Fruit</td>
<td>2,600</td>
<td>2,515</td>
<td>2,297</td>
<td>1,803</td>
<td>1,835</td>
<td>2,014</td>
<td>1,803</td>
<td>2,475</td>
<td>1,835</td>
<td>1,489</td>
<td>1,814</td>
<td>2,423</td>
<td>2,238</td>
</tr>
<tr>
<td>Veg. Pkgs</td>
<td>30,260</td>
<td>73,294</td>
<td>103,016</td>
<td>96,398</td>
<td>68,832</td>
<td>61,479</td>
<td>34,828</td>
<td>18,581</td>
<td>13,626</td>
<td>17,575</td>
<td>20,256</td>
<td>29,575</td>
<td>31,652</td>
</tr>
<tr>
<td>Fruit Pkgs</td>
<td>9,200</td>
<td>37,283</td>
<td>103,016</td>
<td>41,840</td>
<td>24,228</td>
<td>12,536</td>
<td>12,536</td>
<td>17,437</td>
<td>10,229</td>
<td>13,447</td>
<td>17,597</td>
<td>26,002</td>
<td>12,125</td>
</tr>
<tr>
<td>Broken Packages</td>
<td>15,150</td>
<td>37,283</td>
<td>103,016</td>
<td>24,228</td>
<td>13,447</td>
<td>12,536</td>
<td>12,536</td>
<td>17,437</td>
<td>10,229</td>
<td>13,447</td>
<td>17,597</td>
<td>26,002</td>
<td>12,125</td>
</tr>
<tr>
<td>% veg.</td>
<td>76.0</td>
<td>82.2</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
<td>80.3</td>
</tr>
<tr>
<td>% fruit</td>
<td>2.82</td>
<td>5.89</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
<td>4.05</td>
</tr>
</tbody>
</table>

Florida Agricultural Experiment Station
One of the interesting facts disclosed by the above data is the sharp rise in the percentage of broken vegetable containers during the months of February, March and April, a time that corresponds with the maximum movement of vegetables from Florida. There is another slight rise during the months of August, September and October. The largest percentage of broken fruit packages is in February, March and April, the months of greatest movement of Florida citrus. In general it will be observed that the breakage is much greater with vegetable than with fruit packages. Only two exceptions are noted, these in May and December. Information was not available to determine the reasons for this fact. Data for only one month of 1931 were available, but it is interesting to note that the percentage of broken packages of fruit was almost double that for the same month, 1930.

Table VII shows that in the 13 months covered, there were 885,192 broken packages handled. If all the broken packages containing vegetables were loaded into cars of 400 packages each it would make a train of 1,456 cars or 37 percent of all cars shipped. On the same basis, there would have been 723 cars of broken fruit containers or nearly 27 percent of all the cars of fruit shipped.

Figures for breakage of vegetable and fruit packages combined for the years 1929, 1930, 1931, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cars unloaded</th>
<th>Total broken packages</th>
<th>Percent equivalent cars of broken packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929</td>
<td>58,726</td>
<td>1,172,456</td>
<td>49.9</td>
</tr>
<tr>
<td>1930</td>
<td>60,429</td>
<td>888,415</td>
<td>34.7</td>
</tr>
<tr>
<td>1931</td>
<td>61,289</td>
<td>895,275</td>
<td>36.5</td>
</tr>
</tbody>
</table>

Taking the total figures for 1929, 1930 and 1931, there is a tendency toward a reduction in the percentage of broken containers. This seems to indicate that shippers are beginning to realize that broken packages constitute a serious liability to the produce industry. But when 36.5 percent of the containers handled at this one terminal market in 1931 were received in a broken condition, it means that there is still much room for improvement.

**CAUSES OF BROKEN PACKAGES**

Engineers have designed packages of various sizes based upon the volume specified by the Bureau of Standards of the U. S. Dept. of Agriculture. These packages are constructed to withstand certain normal stresses and strains. When they are overpacked, necessitating lids or covers an inch or more longer than
the crate so as to make them reach, it is obvious that such containers are subjected to abnormal strains for which they were not designed. A considerable breakage therefore is to be ex-

Fig. 18.—Car of peppers showing effect of impact and loose loading. Only two transverse car strips per tier were used, allowing the load to shift and telescope. There is evidence, also, of careless nailing.

pected. Some examples of such breakage are shown in Figs. 9, 10, 15, 17, and 18.

IRREGULAR LOADING OR STOWING

The high bulge pack has made the normal and most acceptable methods of stowing the packages in the car impracticable or impossible. The hamper, for example, when overfilled with cabbage, as shown in Figs. 6, 8, and 19, cannot be loaded alternately with tops and bottoms up (Fig. 24) but must be loaded on their sides. Consider also the packages of citrus in Figs. 15 and 16. The high bulge pack dictates the loading of the containers on end. This does not admit of as tight and secure a load as if they were loaded end to end with the tops up. As it is, many of the covers on the lower layers of boxes have been forced off. This is due
Fig. 19.—The over-full or bulged cabbage hampers are difficult to handle on hand trucks. Either the hampers slide or the contents sift out as they are transported from the car to the pier. Note the difference (in the background) of the hampers of beans at the right and those of cabbage at the left. For beans the hamper does very well.
to the fact that the covers are made an inch or more longer than the boxes and unless the bulge is high enough to absorb this excess length, the covers will project over the ends of the boxes and take the weight not only of that box but of the entire load on top of it. A shearing of the end cleats by the nails is inevitable, due to the leverage produced, especially when the load shifts and the boxes are tilted as shown in Fig. 15.

The normal position for loading the Western lettuce crate is top up. Note how impossible this method is from an examination of Fig. 11. These crates were so designed that the upright posts at the corner joints would sustain a heavy load. When placed on its side, however, the cross-head pieces are required to take the load and are not equal to it and a large percentage of breakage.

Fig. 20.—Three desirable containers, adaptable to a wide variety of produce. They are made in various sizes, and are strong but light in weight. Each of them fulfills the requirements of good containers.
results. The large bulging tops are the weakest part of the crate, so that with the sidewise rocking of the car when in motion many of these give way, as shown in Figs. 9, 10, and 16.

POOR AND ILL-ADAPTED CONTAINERS

The development of suitable containers in which to market perishable produce has been quite unscientific. From the beginning of the industry when old bags and boxes of odd shapes and sizes were used up until the present time some progress has been made toward the ideal container. But every producing area developed a number of containers of various types and sizes peculiar to that area, with little or no thought of the basic principles involved. The result has been a great multiplicity of miscellaneous containers that tradition continues in use, although many of them have no real merit, especially in view of the present trends in market demands, keen competition, and the bulge pack.

Fig. 21.—Carload of cabbage as it arrived at the Chicago market. Note the lack of appreciable bulge or loose pack. There is no evidence of load shifts, because the container lends itself to regular and safe stowing and bracing. No breakage and no damage claims entered into the handling of this car, and it brought top price.
An acceptable container for fruits and vegetables should provide:

1. Maximum strength with minimum weight.
2. Adequate ventilation.
3. Ease and rapidity of handling and safety of stowing.
4. Advantageous display of the produce without subjecting it to injury.
5. Adaptability to various kinds of fruits and vegetables so as to reduce the number of types to a minimum.
6. Fixtures for ease of opening for inspection.
7. The price should be reasonable.

The increased freight charges arising from the excessive weight of packages alone is a factor that cannot be disregarded when fractions of cents per unit mean great sums in the aggregate. One illustration of the continued use of a container that is far too heavy and bulky is the potato barrel. Not only is the initial cost of this container large but the shipping weight is 185 lbs. against the net weight of 165. If a bushel box weighing but 4 lbs. were substituted for the barrel, 1,664 lbs. per car of useless weight could be saved. The assumption here is that 185 barrels constitute an average carload.

Fig. 22.—The use of mesh bags for such commodities as cabbage and new potatoes is being tried. Perhaps this may partly solve the breakage problem.
The barrel is also a good example of an undesirable container from the standpoint of ease of handling, ease of inspection, and the displaying of the contents to good advantage, and it may be open to the further objection that it provides inadequate ventilation.

In contrast, examine Figures 20, 21, and 22. The containers shown here possess all the requirements of good containers as listed above, as well as two other desirable, though not essential, features: (1) They are manufactured in several sizes—as the bushel, 1½ bushel and 2½ bushel. This makes them adaptable to a considerable number of vegetables or fruits such as carrots, corn, cucumbers, cabbage, beets, peppers, eggplants, potatoes (both Irish and sweet), squash, lettuce and other leafy vegetables requiring package icing. They may also be used for citrus, pears and muskmelons. (2) These containers do not admit of a high bulge. The adoption of such containers would insure a small initial cost on the basis of quantity production and, of still greater consequence, they would give Florida a limited number of types of real merit.

Certain light weight containers have been used for heavy and odd-shaped produce for which they are ill adapted. The veneer
Fig. 24.—For light weight produce, such as peas and beans, the hamper is satisfactory. The veneer top here shown and most commonly seen should be replaced by the cross-wise slat ted top. (See page 44, Dulaney's Loading Rules No. 7.)
hamper, for example, is not a suitable package for cabbage, cucumbers, beets, carrots, radishes, lettuce, sweet corn or peppers, especially where a bulge pack is attempted. Figures 8, 19, 23, and 24 show the appearance at the market of some of these commodities in hampers. One buyer of Florida lettuce stated that he paid only for the two top layers in each hamper, for this was all he could count on. If more were good he was just lucky. This condition is no doubt due in part to the conical shape of the hamper which tends toward greater compression and lack of aeration at the small end. Package icing in the hamper also is impractical. For beans and possibly peas the hamper may serve a purpose. Where no bulge is used and the tops are well secured onto the inner hoops of the hamper, it is a rather attractive package, as shown in Fig. 24.

A striking illustration of a container that exhibits the contents to good advantage in contrast to one that does not is afforded in Fig. 25.

Another impractical and cheap package is shown in Fig. 26. The lack of rigidity of the side walls of the round bottomed basket permits it to compress or sag under pressure, damaging the produce and allowing it to sift out. Fortunately, this container has practically disappeared from the trade. The tub basket with built-up bottom has replaced it. In 1931 the Georgia peach crop was marketed with relatively little loss and at satisfactory prices where the quantity per package was limited to four pecks of peaches and the top layer ring-packed. In previous years an attempt had been made to crowd five pecks into the round-bottomed basket. The consequent waste, damage and loss were very large.

There is a tendency on the part of growers to demand light weight and cheap containers without due consideration to strength. The kinds and sources of woods used for packages vary widely in their ability to resist stress and strain. Cross-grained and knotty pieces should be carefully avoided.

**IMPROPER ASSEMBLING AND CARELESS NAILING**

The proper sizes and kinds of nails as well as the number and placement in various containers have been carefully studied by engineers. As a result, specifications on these points are now made for all packages admitted to the railroad tariff schedules. Failure to observe these regulations is responsible for a considerable part of the breakage of packages in transit and handling at the markets. As examples, examine Figures 17 and 18. The
Fig. 25.—Note the difference in general appearance between Florida celery (left) and that at the right. The crate on the right displays the contents to excellent advantage. It is the stalks that should be exhibited, and not the leaves.
Fig. 26.—Much of the damage that occurred to this car of peppers in round bottom baskets is due to an improper, ill-adapted container.

side pieces were nailed with too short a nail. It requires a much longer nail to withstand the same stress when driven with the grain of the wood than when driven at right angles to it. As light as peppers are, there is little excuse for broken packages. Containers assembled on the piece basis are frequently faulty and the saving of a few cents in this connection frequently means the loss of dollars at the market on account of breakage.

The bulge pack has made the secure nailing of the lids difficult. The angle at which the lids rest upon the head piece during this operation does not make a good job the rule. The tendency is to drive the nails at an angle rather than squarely into the head piece, thus splitting it and weakening their holding force. Observations at the packinghouses fully confirm the statement. (See Fig. 17.)

*The tariff schedule that applies to Florida is called the Dulaney Tariff.
LOAD SHIFTS AND IMPACTS

Reference to Table VI shows that some breakage of containers is ascribed to load shifts and impacts. That impacts do occur no one doubts, for a heavy train that must be moved in a minimum of time over all kinds of country in all sorts of weather cannot be handled like a dozen pullman cars. This fact has been recognized by the carriers and they have carried on much research work in trying to devise methods of stowing and bracing that will successfully protect goods from damage by ordinary impacts. The results of these investigations and the loading rules, known as the Dulaney Tariffs, are available to all Florida growers and shippers.

A sample page is reproduced, giving detailed loading directions for crates:

STANDARD CONTAINERS AND LOADING RULES NO. 7.

LOADING RULES FOR CRATES

1. All crates must be loaded lengthwise of the car, either with tops up or on the sides.

2. Loading First Stack at Each End of Car: Place crates in first layer across the car on floor tight against bunker wall, leaving equal spaces between crates and also between crates and car wall if desired.

3. Apply two carstrips to the top of the crates directly over the ends of the crates, one strip butting against one car wall and the other strip butting against the opposite wall. Carstrips must be of dimensions not less than 1/8 inch by 1 inch by 8 feet; they must be of sound lumber and of uniform thickness.

4. Each strip must be nailed to each crate with one nail, either cement-coated or plain, of a length not less than 1/8 inch nor more than 7/8 inch greater than the thickness of the carstrip.

5. Complete the stack by placing additional crates directly above those already in place. All layers must be stripped and the strips nailed as described in paragraphs 3 and 4.

6. Loading Remaining Stacks: Place second stack of crates across car in front of crates in first stack with all crates in tight contact with crates in the first stack. Strip each layer and nail each strip in the same manner as described for the first stack. Load succeeding stacks in the same manner, keeping crates tight against crates previously loaded, and stripping and nailing strips to each layer.

7. Filling Excess Space: When the crates do not entirely fill the lengthwise space in the car, brace the load by the use of a center gate, an end bulkhead or bulkheads, and/or spacing strips as described in paragraphs 8, 9, and 10.

8. Bracing the Load with a Center Gate: Brace the load with a center gate (type A) constructed as described on page 52, using one crosspiece on each side of the gate for each layer of crates or with a center gate (type B) constructed as described on page 53, using one upright on each side of the gate for each row of crates.
9. Bracing the Load with an End Bulkhead: Brace the load with an end bulkhead or bulkheads (type A) constructed as described on page 54, using one crosspiece for each layer of crates or with an end bulkhead or bulkheads (type B), constructed as described on page 55, using one upright for each row of crates.

10. Bracing the Load with Spacing Strips: Place one strip horizontally against the center of each layer of crates, nailing it securely with one nail to each crate. Strips must be of uniform thickness and not less than 1 inch wide. Not more than 1½ inches of space may be taken up between any two adjacent stacks, and not more than two strips may be used at any one place, one being nailed on top of the other. Not more than six inches of space may be taken up in the car through the use of spacing strips; if the space in the car is greater than six inches, some or all of it must be taken up by an end bulkhead or bulkheads or the entire space may be taken up by a center gate.

In Figures 15, 16, 18 and 23 is shown typical damage due to improper loading. Car 62328, shown in Fig. 18, had but one transverse car strip between the third and fourth tiers of crates when the loading stipulations require such stripping for every tier at both ends of the crates. The load shifted and the crates nested. In Car 66063, Fig. 27, the spacing strip brace was valueless due to the initial looseness of the load and the brace was not constructed according to regulations. An end gate or center gate should have been used. Loose loading can be overcome effectively only by using jacks. Car No. 37719 was a car of radishes with no evidence of any bracing. There were 95 broken containers in this one car.

The buckling of the containers in Car 51338, Fig. 16, is clearly the result of impact. But prior to the impact there was a loose load which shifted. Contrast this
Fig. 28.—This car arrived without any breakage. It, too, was subjected to impacts incident to the moving of a heavy train, but it had been properly stowed and braced. Note the absence of bulge pack.

with the conditions shown in Figures 11, 21, and 28, where jacks were used before the cars were released. Cars of citrus from Florida are evidently much less carefully stowed and braced than those from California. Greater breakage and more damage claims result to Florida fruit, as indicated by the following report from an experienced market observer:

"Pittsburgh Produce Terminal advise that 25 to 50 percent of the loss and damage to shipments of oranges and grapefruit from Florida is due to bulge pack and excessive bulge pack. There is practically no loss and damage to this commodity from California due to this cause, a flatter pack being used.

"The shipments from California are very well stowed, while shipments from Florida are poorly stowed; most of damage from California due to cut sides and easily repaired."

It is possible to reduce losses due to impact almost to the vanishing point with little or no additional expense to the shipper. Such expense should be looked upon as exceedingly cheap insurance, for the losses and costs which accrue at the markets very quickly outweigh the costs of a thorough job at the point of origin (Fig. 28).
During the month of November, 1931, 45 cars of eggs were shipped from the Pacific coast to Eastern markets—a distance of about 3,000 miles. These were in trains of vegetables and fruits, and were therefore subjected to all the impacts which they received. Of the 9,000,000 eggs only 546 were broken—only 1 out of 16,000 or about 1 doz. per car. The damage claims on eggs are therefore exceedingly low. The standard egg crate is very fragile, but, by adhering to well-known methods of stowing and bracing, the breakage in transit and consequent loss is almost negligible.

BREAKAGE INCIDENT TO UNLOADING

Produce in cars to be unloaded at Pier 28, New York, is brought over from the Jersey shore on large floats—10 cars per float. When the cars are run onto these floats it sometimes happens that the doorway of the car loaded last at point of origin is to the outside of the float. Since the runway is in the center of the float, the “breaking of the load”, that is, getting out the first package, is quite difficult in such cases and sometimes a package or two is broken in this way. Also, when top ice has been used, sometimes packages are frozen together and in separating them an occasional package is broken.

BREAKAGE DUE TO TOP ICING

When large cakes of ice are thrown on top of the packages in a loaded car some breakage results at that time (Fig. 9). Top icing should be done with cracked or flaked ice. This would also do away with the breakage incident to the melting ice softening the slats of the containers and crushing the contents. While breakage and damage to produce from this cause do not appear to be large, it is a contributing factor, and can and should be stopped.

WILFUL BREAKAGE

At most of the important market terminals there is a type of receiver who has no hesitancy in wilfully breaking the packages as he unloads the car. This affords him, first, an opportunity of heavily discounting the price paid for the produce, and, second, he can institute damage claims against the carrier. If both succeed, as they too frequently do, he is in a position to undersell the honest consignee and at the same time make a large profit. So prevalent did this practice become at one large market that the railroad company was compelled to put guards in the yards while
the cars were being unloaded. If broken packages were not the rule, these disreputable operators could not use this method of carrying on their nefarious trade. Its connection with the bulge pack is evident. The method of unloading the produce at the New York Terminal does not admit of this practice.

RESULTS OF BREAKAGE

1. Creates bad psychological effect upon all who handle or see the produce.
2. Causes a mixing of grades.
3. Causes damage to produce.
4. Makes payment of re-cooperage charges necessary.
5. Provides the basis for the filing and payment of most damage claims.

Each of these factors is considered, in the order given.

1. Creates bad psychological effect upon all who handle or see the produce.

Consider, for example, the natural reaction of a prospective buyer, railroad employee, market inspector or any visitor at the

Fig. 29.—Cabbage packed in Western lettuce crates, supposed to hold 2½ bushels. Note the very high bulge. These crates were over-packed about 18 percent by weight. This lot was just opposite the Florida cabbage shown in Fig. 27.
terminals to the conditions exhibited in Figures 9, 10, 16, 17, 18, 19, 23, and 26. It is important to remember that such produce is not the only produce upon the market, but that large quantities of well-graded, attractive-appearing vegetables and fruits are offered on this same market, such as shown in Figures 21, 22, 24, 25, and 29. If one assumes for a moment the role of buyer, it is evident which lot he would choose and for which he would willingly pay the best price. But the buyer is not the only one who contributes toward giving produce from any given area a good or bad reputation. Even the stevedores readily recognize the origin of various packages and rate them as good or bad (Fig. 19).

2. Causes a mixing of grades.

Where ill-adapted, poorly-constructed or improperly stowed containers such as shown in Figures 18 and 23 are used for vegetables or fruits of two or more grades in the same car, a mixture of these grades is imminent. The broken containers in these cases were re-coopered and then refilled from the mixture of grades on the floor of the car, so that the cost of the original grading was lost, since the produce sold as “ungraded.” Not only did the shipper of these cars of peppers and cucumbers lose heavily, but all growers and shippers of peppers and cucumbers, especially from that same territory, were penalized on that market on account of the bad cars. A few such arrivals can and often do completely demoralize an otherwise steady market.

3. Causes damage to produce.

Fruits and vegetables of most kinds cannot be shunted about and bruised without inflicting serious damage thereto. When the cabbage shown in Figures 8, 10, and 19 were repacked, many of the heads had been torn. A considerable number of citrus fruits were cut, mashed and bruised as the result of the load shift shown in Fig. 16.

Such conditions do afford the unscrupulous buyers and jobbers an opportunity of heavily discounting the price and at the same time filing damage claims, even when the contents of the packages show little or no actual damage.

4. Makes payment of re-cooperage charges necessary.

On the night of February 14, 1932, there were 468 cars of vegetables and fruits unloaded at Pier 28 in New York. This required a force of 315 men working from 4 p.m. Sunday until daylight Monday. Forty-seven of these men, or approximately 15 percent, spent their entire time re-coopering broken packages. In Fig. 10, 56 broken crates out of a load of 320 are shown being re-coopered on the pier. The men who re-cooper these packages are
equipped with spare parts of all the principal containers that come into that market and they have become very adept at making over badly wrecked containers. This service is a necessity and must be paid for either directly or indirectly by the growers. It should therefore be evident that responsibility for a carload of produce does not cease when the seal is attached at the loading point.

5. Provides the basis for the filing and payment of most damage claims.

In 1930 the railroads of the United States disbursed $36,239,240 for loss and damage claims. Of this amount, $5,762,019, or approximately 16%, was for fresh vegetables, the largest single item. Two and eight-tenths percent, or $1,020,105, went to pay damage claims for citrus fruits.

Considering some of the chief fresh produce items separately, the data given in Table VIII are illuminating.

TABLE VIII.—Loss and Damage Claims Disbursed by the Railroads of the United States for the Year 1930, for 18 Commodities; also Average Amount Paid on Florida Shipments Based Upon National Figures.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Cars Originated</th>
<th>Loss and Damage Amount</th>
<th>No. cars, Fla. av. 1921-31</th>
<th>Cost in damage claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>34,137</td>
<td>$1,366,783</td>
<td>8,082</td>
<td>$323,603.28</td>
</tr>
<tr>
<td>Carrots</td>
<td>12,299</td>
<td>366,901</td>
<td>5</td>
<td>149.15</td>
</tr>
<tr>
<td>Cantaloupes</td>
<td>23,826</td>
<td>542,498</td>
<td>34</td>
<td>774.18</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>10,040</td>
<td>222,127</td>
<td>7</td>
<td>154.84</td>
</tr>
<tr>
<td>Lettuce</td>
<td>55,636</td>
<td>1,128,395</td>
<td>1,741</td>
<td>35,307.48</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>7,616</td>
<td>150,806</td>
<td>1,885</td>
<td>37,225.00</td>
</tr>
<tr>
<td>Peppers</td>
<td>3,140</td>
<td>57,988</td>
<td>1,552</td>
<td>28,666.44</td>
</tr>
<tr>
<td>Plums-Prunes</td>
<td>5,712</td>
<td>156,939</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lemons</td>
<td>14,250</td>
<td>178,014</td>
<td>12.49</td>
<td>0</td>
</tr>
<tr>
<td>Watermelons</td>
<td>56,769</td>
<td>608,358</td>
<td>8,376</td>
<td>8,105.28</td>
</tr>
<tr>
<td>Oranges</td>
<td>64,200</td>
<td>627,705</td>
<td>23,745</td>
<td>232,226.10</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>19,981</td>
<td>183,335</td>
<td>19,906</td>
<td>182,538.02</td>
</tr>
<tr>
<td>Mixed vegetables</td>
<td>31,127</td>
<td>293,925</td>
<td>19,906</td>
<td>34,233.84</td>
</tr>
<tr>
<td>Celery</td>
<td>26,326</td>
<td>246,179</td>
<td>7,946</td>
<td>74,295.10</td>
</tr>
<tr>
<td>Strawberries</td>
<td>10,535</td>
<td>76,294</td>
<td>1,110</td>
<td>8,114.10</td>
</tr>
<tr>
<td>Cabbage</td>
<td>38,059</td>
<td>178,014</td>
<td>23,745</td>
<td>232,226.10</td>
</tr>
<tr>
<td>Potatoes—White</td>
<td>251,000</td>
<td>579,084</td>
<td>5,290</td>
<td>12,167.00</td>
</tr>
<tr>
<td>&quot;—Sweet</td>
<td>16,543</td>
<td>98,967</td>
<td>129</td>
<td>683.82</td>
</tr>
</tbody>
</table>

Total ...                      | 86,753         | $1,066,940.83          |

The most striking fact shown in the above table is the large amount paid per car and in the aggregate in damage claims for tomatoes. It represents nearly three times that paid for the average commodity. From the research work already referred to, regarding the effects of the bulge pack, much of this loss is undoubtedly attributable directly to this one cause.
The total damage claims paid of over a million dollars per year represent a loss of this amount to the growers of Florida annually. In fact, it is larger than the amount shown, for the citrus shipments in the past two years have exceeded the average for the 9-year period by a considerable margin. This is also true of strawberries and watermelons, and the data do not include beans and some fruits. Furthermore, there is evidence that the damage claims paid per car on some of the commodities from Florida are larger than the average for the country, thus swelling the total claims.

**SUMMARY AND CONCLUSIONS**

Evidence has been advanced that indicates the failure of Florida to maintain her quota of increased production of a majority of her vegetable crops as compared to competing areas. New production areas are crowding Florida vegetables off the markets through the creation of better varieties, closer grading and the use of better and more attractive packages.

The bulge pack is directly and indirectly costing the vegetable and fruit growers millions of dollars annually. Not only do they lose a legitimate profit on the excess produce put into each overpacked container, but the consequent damage to the produce and the package paves the way for discounted prices, re-cooperage charges and immense damage claim payments, all of which the growers pay. The indications are that relatively few damage claims are collected by the growers, the chief beneficiaries being the receivers and shippers.

The breakage of containers in transit due to poor nailing and assembling as well as the use of poor containers is far too great. These factors, coupled with loose stowing and lack of correct bracing of the load in the car, result in large losses. Growers must realize that a carload of well-graded, properly packed produce stowed in the car according to tariff regulations has a real intrinsic value, ranging from hundreds to thousands of dollars; that such a car will arrive at the markets in first-class condition under ordinary circumstances, and that the chances of realizing a profit on such a car are many times greater than on many that are now rolling. In many instances such better order cars could be put into the markets at no greater cost than is now expended. Better management and supervision of labor appear to be needed. But, granting that such costs may be somewhat increased at point of origin, they must be regarded as excellent insurance against huge losses at the point of destination. In the field of competitive
selling, a good reputation cannot be over-valued and at the present time Florida produce does not generally enjoy this distinction. In order to establish a reputation for high quality and at the same time effectively reduce the losses now sustained, the following recommendations are offered:

1. Careful and constant investigations to determine the market demands.
2. The creation of new and better adapted varieties and strains of fruits and vegetables through a systematic program of plant introduction, plant breeding and selection.
3. The planting of vegetables and fruits should be limited to only a few of those strains and varieties that show a clear adaptation to the Florida environment and that are in good demand on the markets. This would insure more uniform and higher quality.
4. Closer grading and inspection at point of origin.
5. Strong, light and easily handled packages that display the contents to advantage should be used. The number of kinds and types of such containers should be reduced to a minimum in the interests of standardization and ease of selling as well as the economy of buying such containers. A rectangular shaped container admitting of no large bulge is the logical type, so far as packing, stowing and handling with the least breakage and loss are concerned.
6. A strict adherence to the loading rules as specified in the Dulaney tariff, both as to the assembling and nailing of the containers and to the stowing and bracing of the load, would effectively reduce waste.
APPENDIX

Official United States and Florida Standards for the grading of the principal fruits and vegetables.

STRING BEANS, WAX OR GREEN

GRADES

U. S. No. 1 shall consist of beans of similar varietal characteristics which are fairly bright, fresh, fairly young and tender, firm, of reasonably uniform size, and free from damage caused by dirt, leaves, leaf stems, foreign matter, hail, disease, insects or mechanical or other means.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the beans in any lot may be below the requirements of this grade, but not to exceed a total of 5 percent, shall be allowed for the defects causing serious damage, and not more than 2-1/2 of this amount or 2 percent, shall be allowed for beans affected with soft rot.

U. S. No. 2 shall consist of beans of similar varietal characteristics which are fairly fresh, firm and free from serious damage caused by dirt, leaves, leaf stems, foreign matter, hail, disease, insects, or mechanical or other means.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of any lot may be below the requirements of this grade.

Unclassified shall consist of beans which are not graded in conformity with any of these grades.

U. S. Fancy is provided for the use of those who wish a special grade for the superior beans which meet its requirements.

U. S. Fancy shall consist of beans of similar varietal characteristics which are well formed, bright, clean, fresh, young and tender, firm, of reasonably uniform size and free from damage caused by leaves, leaf stems, foreign matter, hail, disease, insects or mechanical or other means.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the beans in any lot may be below the requirements of this grade, but not to exceed a total of 5 percent, shall be allowed for defects causing serious damage, and not more than 2-1/2 of this amount or 2 percent, shall be allowed for beans affected with soft rot.

DEFINITION OF GRADE TERMS

As used in these grades:

1. “Similar varietal characteristics” means that the beans in any container are of the same color and general type. For example, wax and green beans, or beans of the Refugee and Valentine types must not be mixed.

2. “Firm” means that the beans are not wilted or flabby.

3. “Damage” means that the beans are injured to an extent readily apparent upon examination. Beans showing spots due to Blight, Anthracnose or similar spots are damaged.

4. “Serious damage” means that the beans are injured to such an extent as to seriously injure the appearance or keeping quality of the lot.

March 31, 1927.

BUNCHED BEETS

GRADES

U. S. No. 1 shall consist of beets of similar varietal characteristics which are firm, fairly smooth, free from decay and from damage caused by growth cracks, dirt, disease, insects, or mechanical or other means. The tops shall be fresh and either full size or cut back to not less than 6 inches in length. Unless otherwise specified, the minimum diameter of the beets shall be 1 1/2 inches.

In order to allow for variation incident to proper grading and handling, not more than 5 percent, by count, of any lot may be below the specified
minimum diameter. In addition, not more than 10 percent, by count, of any lot may be below the remaining requirements of this grade but not more than one-tenth of this amount, or 1 percent, shall be allowed for decay. Unclassified shall consist of beets which are not graded in conformity with the foregoing grade.

SIZE TERMS

The following terms are provided for describing the diameters of any lot: Small means less than 2 inches; Medium means 2 to 3 inches inclusive; Large means over 3 inches.

BUNCHING

Bunches shall be fairly uniform in size.

DEFINITION OF TERMS

As used in these grades:

"DamaKe" means any injury which materially affects the appearance of the lot and causes appreciable waste in the ordinary preparation for use.

"Diameter" means the greatest dimension of the root taken at right angles to the longitudinal axis.

"Firm" means that the beets are not soft, flabby or shriveled.

"Fresh" means that tops of beets are not badly wilted and are practically free from discolored or decayed leaves.

August 9, 1927.

CABBAGE

U. S. No. 1 shall consist of heads of cabbage which are of one type, of reasonable solidity and well trimmed; which are not soft, withered, puffy or burst; which are free from soft rot, seed stems and from damage caused by discoloration, freezing, disease, insects or mechanical or other means.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of any lot may be below the requirements of this grade but not to exceed one-fifth of this amount or 2 percent may be allowed for decay.

U. S. NO. 2

U. S. No. 2 shall consist of heads of cabbage which do not meet the requirements of the foregoing grades.

SIZE

In addition to the statement of grade, any lot may be classified as Small, Medium, Large, Small to Medium, or Medium to Large.

Domestic: Small, under 2 lbs.; Medium, 2 to 5 lbs.; Large, over 5 lbs.

In order to allow for variations in sizing not more than a total of 15 percent, by weight, of any lot may vary from the size specifications but not more than 10 percent may be either above or below requirements for each class. This tolerance is in addition to the tolerance for the grade.

DEFINITION OF TERMS

As used in these grades:

"One type" means that all the lot is Pointed, Danish, Domestic, Savoy or Red as the case may be. Pointed type includes such varieties as Early Jersey Wakefield, Charleston Wakefield, Early York, Winningstadt, and others which normally develop oblong, conical or pointed shaped heads. Danish type includes such late maturing varieties as Danish Ballheads or Hollander, Danish Roundhead, etc., and such early maturing varieties as Cannonball, Danish Summer Ballhead, etc., which normally develop hard, tight leaved, compactly formed heads. A head of any such variety even after trimming
will appear tight and smooth leaved around the basal portion and when viewed from the stem end, circular and regular in outline. Domestic types include such varieties as Succession, All Head Early, Flat Dutch and others that are commonly termed Domestic and which normally develop heads flat in shape and less compactly formed than those of the Danish type. The term also includes such varieties as Copenhagen, Glory of Enkhuizen and others that develop heads roundish in shape but which in solidity of head and storage qualities are similar to the Flat Domestic type.

"Reasonable solidity" means fairly firm for pointed type cabbage and southern Domestic type cabbage. Northern Domestic type cabbage shall be firm and Danish or Hollander type fairly hard.

"Well trimmed" means that the head shall have not more than four wrapper leaves attached and any portion of these leaves appreciably injured by worms or other means shall be removed, and the stem shall be not longer than one-half inch.

"Soft" means loosely formed or lacking compactness.

"Puffy" means that the heads are very light in weight in comparison to size and have air spaces in the central portion. They normally feel firm at time of harvesting but soften quickly. They are known as "Balloon Heads" in certain sections.

"Seed stems" means those heads which have seed stalks showing or in which the formation of seed stalks has plainly begun.

"Free from damage" means that the head shall not be injured to an extent readily apparent upon examination.

Oct. 1, 1924.

BUNCHED CARROTS

GRADES

U. S. No. 1 shall consist of carrots of similar varietal characteristics which are firm, fairly well formed, fairly smooth, free from decay and from damage caused by growth cracks, dirt, disease, insects, mechanical or other means. The tops shall be fresh and either full size or cut back to not less than 6 inches in length. Unless otherwise specified, the minimum diameter of the carrots shall be one inch.

In order to allow for variations incident to proper grading and handling, not more than 5 percent, by count, of any lot, may be below the specified minimum diameter. In addition, not more than 5 percent, by count, of any lot may be below the remaining requirements of this grade but not more than one-fifth of this amount or 1 percent, shall be allowed for decay.

Unclassified shall consist of carrots which are not graded in conformity with the foregoing grade.

SIZE TERMS

The following terms are provided for describing the diameter of any lot: Small means less than 1¾ inches; Medium means 1¾ inches to 2½ inches, inclusive; Large means over 2½ inches.

BUNCHING

Bunches shall be fairly uniform in size.

DEFINITIONS OF TERMS

As used in these grades:

"Damage" means any injury which materially affects the appearance of the lot or causes appreciable waste in the ordinary preparation for use.

"Diameter" means the greatest dimension of the root taken at right angles to the longitudinal axis.

"Firm" means that the carrots are not soft, flabby or shriveled.

"Fresh" means that tops of carrots are not badly wilted and are practically free from discolored or decayed leaves.

"Fairly well formed" means that the carrots are not so forked or misshapen as to cause an appreciable waste in the ordinary preparation for use.

August 9, 1927.
ROUGH CELERY

U. S. NO. 1

U. S. No. 1 shall consist of well trimmed stalks of celery of similar varietal characteristics which have fairly good heart formation and which are fairly well blanched, not pithy or wilted and which are free from damage caused by seed stems, freezing, disease, insects, or mechanical or other means. See size for specifications on stalk length.

In order to allow for variations incident to proper grading and handling, not more than 10 percent by count, of the stalks in any lot may be below the requirements of this grade, but not to exceed one-fifth of this tolerance or 2 percent shall be allowed for decay.

U. S. No. 2

U. S. No. 2 shall consist of stalks of celery which do not meet the requirements of U. S. No. 1.

SIZE

Where celery in sized and uniformly packed in standard containers the number of stalks may be stated in terms of dozens and half dozens.

In order to allow for variations incident to proper packing, the number of stalks in any container shall not vary more than 5 percent from the number indicated.

STALK LENGTH

Stalk length may be stated in terms of the nearest even inch as 18 in., 20 in., etc., in accordance with the facts but unless otherwise specified the minimum stalk length of the U. S. No. 1 celery shall be 18 inches.

In order to allow for variations incident to proper packing not more than 5 percent of the stalks may be shorter than the specified minimum stalk length.

DEFINITION OF TERMS

As used in these grades:

"Well trimmed" means that the outside coarse and damaged branches have been removed and the portion of the root remaining is not more than 3 inches in length.

"Stalk" means an individual plant.

"Similar varietal characteristics" means that the stalks in any container have the same color and character of growth. For example, celery of Giant Pascal and Golden Self-blanching types must not be mixed.

"Fairly good heart formation" means that the inner heart branches shall be of reasonable number, length and stockiness.

"Fairly well blanched" means that the stalks are of a light greenish to white color. Green spots are not fairly well blanched.

"Pithy" means that the branches have an open texture with air spaces in the central portion.

"Free from damage" means that the celery shall not be injured to an extent readily apparent upon examination.

"Seed stems" means those stalks which have seed stems showing or in which the formation of seed stems has plainly begun.

Jan. 6, 1925.

CITRUS FRUITS (FLORIDA)

GRADES

U. S. Fancy shall consist of citrus fruits of similar varietal characteristics which are mature, firm, well formed, smooth, thin skinned, free from decay, bruises, creasing, scale, scab, black or unsightly discoloration, ammoniation, from cuts which are not healed, and from damage caused by dirt or other foreign materials, sprouting, sprayburn, dryness, limb rubs, thorn scratches, scars, disease, insects or mechanical or other means.
In this grade not more than 75 percent of the surface of each fruit may show light discoloration. In addition to the statement of grade any lot may be further classified as Bright or Golden as hereinafter defined.

U. S. No. 1 shall consist of citrus fruits of similar varietal characteristics which are mature, firm, well formed, fairly smooth, fairly thin skinned, free from decay, bruises, creasing, black or unsightly discoloration, from cuts which are not healed and from damage caused by dirt or other foreign materials, sprouting, sprayburn, dryness, limb rubs, thorn scratches, scars, scale, scab, ammoniation, disease, insects or mechanical or other means.

In this grade (except when designated U. S. No. 1 Russet) not more than 75 percent of the surface of each fruit may show light discoloration. In addition to the statement of grade any lot may be further classified as Bright, Golden or Russet, as hereinafter defined.

U. S. No. 2 (Choice) shall consist of citrus fruits of similar varietal characteristics which are mature and fairly firm, which may be slightly rough and slightly misshapen but which are free from decay, bruises, black or unsightly discoloration, from cuts which are not healed, and from serious damage caused by dirt or other foreign materials, sprayburn, dryness, limb rubs, thorn scratches, scars, scale, scab, ammoniation, creasing, disease, insects or mechanical or other means.

In addition to the statement of grade any lot may be further classified as Bright, Golden, or Russet, as hereinafter defined.

COLOR CLASSIFICATION

Any lot of fruit may be classified according to the amount of discoloration as follows: Bright, when the surface of the fruit shows not more than 20 percent light discoloration. Golden, when the surface of the fruit shows not more than 75 percent light discoloration. Russet when the surface of the fruit shows no black or unsightly discoloration.

TOLERANCE

In order to allow for variations incident to proper grading and handling in each of the foregoing grades the following tolerances will be permitted in the grades as specified:

U. S. Fancy and U. S. No. 1 Grades

Not more than 10 percent, by count, of any lot may be below the requirements of either of these grades other than for discoloration, but not more than one-twentieth of this amount or % percent shall be allowed for decay.* In addition, not more than 10 percent, by count, of any lot may not meet the requirements relating to discoloration but not to exceed one-fourth of this amount or 2% percent, shall be allowed for black or unsightly discoloration.

U. S. Fancy Bright or Golden, and U. S. No. 1 Bright or Golden Grades

Not more than 10 percent, by count, of any lot may be below the requirements of any of these grades but not more than one-twentieth of this amount or 2% percent, shall be allowed for black or unsightly discoloration and not more than one-twentieth of this tolerance or % percent, shall be allowed for decay.*

U. S. Fancy Russet, U. S. No. 1 Russet, U. S. No. 2 Bright, Golden or Russet Grades

Not more than 10 percent, by count, of any lot may be below the requirements of any of these grades, but not more than one-twentieth of this amount or ½ percent, shall be allowed for decay.*

*Decay, or other deterioration developing in transit on citrus fruits otherwise up to the grade shall be considered as affecting the condition and not the grade.
DEFINITIONS OF GRADE TERMS

As used in these grades:

1. "Similar varietal characteristics" means that the fruits in any container are similar in color and shape.
2. "Firm" as applied to grapefruit and oranges of the Mandarin Group (Tangerines, Satsumas, King, Mandarin) shall be interpreted to mean that the fruit shall not be badly puffy or the skin very loose. Such fruit if dry shall not be considered firm.
3. "Free from damage" means that any injury from the causes mentioned shall not materially affect the appearance or the edible or shipping quality of the fruit.
4. "Light discoloration" means smooth light russetting or any other smooth surface discoloration of a darker color provided it does not detract from the appearance of the fruit to a greater extent than the maximum or light discoloration allowed in each grade.
5. "Fairly firm" as applied to oranges means that the fruit is slightly soft but not bruised; as applied to grapefruit means that the skin may be thick and slightly puffy; as applied to Mandarin, Satsuma, Tangerine, King and other varieties of the Mandarin group means that the skin of the fruit is not badly puffy but may be slightly loose.
6. "Slightly rough" means that the skin is not of smooth texture but is not creased or badly wrinkled.
7. "Slightly misshapen" means that the fruit is not of characteristic shape but is not decidedly pear shaped, elongated or sharply pointed.
8. "Serious damage" means that any injury from the causes mentioned shall not seriously affect the appearance or the edible or shipping quality of the fruit.

Nov. 24, 1926.

GREEN CORN

GRADES

U. S. No. 1 shall consist of ears of green corn of similar varietal characteristics which are well trimmed, well formed, and free from damage caused by smut or other disease, insects, mechanical or other means. Cobs shall be well filled with plump and milky kernels and well covered with fresh, green husks.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be below the requirements of this grade.

U. S. Fancy shall consist of ears of green corn which meet all the requirements of U. S. No. 1 grade except that the ears shall be free from insect injury instead of free from damage caused by insect injury.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be below the requirements of this grade.

Unclassified shall consist of green corn which is not graded in conformity with either of the foregoing grades.

DEFINITION OF TERMS

As used in these grades:

"Similar varietal characteristics" means that the ears in any container are of similar color and character of growth. Ears of field and sweet corn or white and yellow corn shall not be mixed in the same container.

"Well trimmed" means that the ears are practically free from loose husks and that the shank shall not extend more than 1 inch beyond the point of attachment of the outside husk.

"Well formed" means that the ears are not stunted. Nubbins are not well formed ears.

"Damage" means injury from any cause which materially affects the appearance or edible quality of the ear. Ears showing worm injury extending not more than 1 3/4 inches from the tip of the cob shall not be regarded
as damaged, but worm injury affecting the kernels on other parts of the cob shall be considered as damaged.

"Well filled" means that the rows of kernels show fairly uniform development, and that the appearance and quantity of the edible portion of the ear are not materially affected by poorly developed rows.

"Plump and milky" means that the kernels are well developed but not over mature or shriveled.

"Fresh" means that the husks are not badly wilted, dried or turning yellow or brown.

January 20, 1927.

EGGPLANTS

U. S. NO. 1

U. S. No. 1 shall consist of eggplants of similar varietal characteristics which are firm, fairly smooth, of good characteristic color, fairly well shaped, which are free from damage caused by disease, insects, mechanical or other means. If count is specified, the eggplants shall be reasonably uniform in size in the packages.

In order to allow for variations incident to proper grading and handling, 10 percent, by count, of any lot may be below the requirements for this grade, but no part of this tolerance shall be allowed for decay.

U. S. NO. 2

U. S. No. 2 shall consist of eggplants which are firm and which are free from serious damage caused by disease, insects, mechanical or other means.

In order to allow for variations incident to proper grading and handling, 10 percent, by count, of any lot may be below the requirements for this grade, but no part of this tolerance shall be allowed for decay.

U. S. NO. 3

U. S. No. 3 shall consist of eggplants which do not meet the requirements of the foregoing grades.

MARKING REQUIREMENTS FOR SIZE

The size of eggplants may be designated in terms of count or minimum diameter.

Where the minimum size is specified, in order to allow for variations incident to proper packing, not more than 5 percent, by count, of the eggplants in any package, may be below the size specified.

DEFINITIONS OF TERMS

As used in these grades:

"Similar varietal characteristics" means that the eggplants shall be alike as to shape and general characteristics.

"Firm" means that the eggplants shall not be flabby or soft.

"Good characteristic color" means that the eggplants are uniformly colored a deep purple. Streaked color, light purple, reddish or yellowish color shall not be considered good characteristic color.

"Fairly well shaped" means that those of the long type such as Florida High Bush may be either cylindrical or slightly curved but that they shall not be materially deformed; those of thick, chunky type such as New York Improved may show the characteristic scallops at the base and may be slightly curved, but they shall not be materially deformed.

"Fairly smooth" means that any scars present do not materially affect the appearance, shape or color.

"Free from damage" means that the eggplants are not injured to an extent apparent upon examination.

"Serious damage" means such damage as can be removed without material loss in preparation for use.

"Diameter" means the greatest dimension at right angles to the longitudinal axis.

April 14, 1925.
AMERICAN (EASTERN TYPE) BUNCH GRAPES

GRADES

U. S. Fancy shall consist of grapes of one variety which are well colored, mature, firmly attached to capstems, not shattered, split, crushed, dried, wet or soft; which are free from mold, decay, mildew, berry moth, russetting, and from damage caused by freezing, disease, insects or other means. Not less than 75 percent of the bunches shall be compact for the variety and the remainder shall be fairly compact. Compact portions of bunches consisting of no less than five (5) berries may be used to fill open spaces between whole bunches.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, of the berries, by weight, of any lot may be below the requirements of this grade, but not more than 1/10 of this amount or 1 percent may be affected by mold or wet decay. In addition, not more than 5 percent, by weight, of any lot may consist of bunches which are straggly.

U. S. No. 1 shall consist of grapes of one variety which are fairly well colored, mature, firmly attached to capstems, not shattered, split, crushed, dried, wet or soft, which are free from mold, decay, mildew, berry moth, excessive russetting and from damage caused by freezing, disease, insects or other means. Bunches shall not be straggly.

In order to allow for variations incident to proper grading and handling, not more than 10 percent of the berries, by weight, of any lot may be below the requirements of this grade, but not more than 1/5 of this amount or 2 percent, may be affected by wet mold or wet decay. In addition, not more than 15 percent, by weight, of any lot may consist of straggly bunches.

MIXED VARIETIES

Any lot of grapes consisting of more than one variety which meets all other requirements of either "U. S. Fancy" or "U. S. No. 1" may be designated as "U. S. Fancy Mixed" or "U. S. No. 1 Mixed."

Unclassified. Grapes which are not graded in conformity with the foregoing grades may be designated as Unclassified.

DEFINITION OF TERMS

As used in these grades:

"Mature" means that the grapes are juicy, palatable and have reached that stage of development at which the skin of the berry easily separates from the pulp. Frozen or slightly frosted stock should not be confused with mature stock.

"Well colored" means that the berries shall show full color characteristic of the variety.

"Fairly well colored" means that not less than 75 percent, by weight, shall show full color characteristic of the variety. 25 percent may show partially or poorly colored berries which are not characteristic of immature berries.

"Shattered berries" means berries which have separated from the bunch.

"Compact bunches" means well filled bunches, with no open spaces.

"Fairly compact" means that bunches are well filled but that the berries are not closely spaced as in "compact bunches."

"Straggly" means a decidedly open bunch with large open spaces and very few berries. Small immature shotberries characteristic of the Worden variety should be disregarded unless they are excessive in number and detract materially from the appearance of the lot.

May 12, 1926.

LETTUCE

GRADES

U. S. No. 1 shall consist of heads of lettuce of similar varietal characteristics which are fresh and well trimmed; which are not decayed, split or burst, and which are free from seed stems and doubles and from damage caused by
dirt, wilting, freezing, tip burn, disease, insects or mechanical or other means. The appearance of the wrapper leaves shall not be seriously affected from any cause. Not less than 75 percent of the heads of Iceberg type lettuce shall be firm and the remainder shall be fairly firm. Heads of Big Boston type lettuce shall be fairly firm.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be soft or otherwise below the requirements of this grade. Heads of Big Boston type lettuce shall be free from defects caused by dirt, wilting, freezing, disease, insects or mechanical or other means. The wrapper leaves shall be of a good green color and free from serious damage caused by freezing.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be soft or otherwise below the requirements of this grade.

U. S. No. 2 shall consist of heads of lettuce of similar varietal characteristics which are fresh, which are not decayed, split or burst, and which are free from seed stems and from damage caused by wilting, tip burn, disease, insects or mechanical or other means and from serious damage caused by freezing.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be soft or otherwise below the requirements of this grade.

U. S. Fancy shall consist of heads of lettuce of similar varietal characteristics which are fresh and well trimmed, and which are not decayed, split or burst, and which are free from tip burn, seed stems and doubles and from damage caused by dirt, wilting, freezing, disease, insects, mechanical or other means. The wrapper leaves shall be of a good green color and free from serious damage caused by any cause. Not less than 50 percent of the heads of Iceberg type lettuce shall be hard and the remainder shall be firm. Heads of Big Boston type lettuce shall be firm.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be soft or otherwise below the requirements of this grade.

DEFINITIONS OF TERMS

As used in these grades:

"Similar varietal characteristics" means that the heads in any container have the same color and characteristic leaf growth. For example, lettuce of the Iceberg and Big Boston types must not be mixed.

"Fresh" means crisp and green.

"Well trimmed" means that the coarse outer leaves have been removed leaving the head protected by green wrapper leaves. Heads which show a considerable number of wrapper leaves in excess of those required to protect the head shall not be regarded as well trimmed. Heads showing a ragged appearance caused by the removal of portions of the outside leaves shall not be considered U. S. No. 1.

"Seed stems" means those heads which have seed stems showing or in which the formation of seed stems has plainly begun.

"Fairly firm" means that although the head is not firm, it is well formed and not soft or spongy.

"Hard" means that the head is solid.

"Free from damage" means that the heads shall not be injured to an extent readily apparent upon examination.

"Free from serious damage" means free from any injury which causes a loss of a portion of the edible part of the head. The loss of the crispness due to freezing shall not be considered serious damage. Wrapper leaves which show brown margins shall not be regarded as seriously damaged unless the injury is extensive enough to affect the general appearance of the head.

Dec. 1, 1926.

POTATOES (WHITE)

GRADES

U. S. No. 1 shall consist of potatoes of similar varietal characteristics which are not badly misshapen, which are free from freezing injury and soft
rot, and from damage caused by dirt or other foreign matter, sunburn, second growth, growth cracks, hollow heart, cuts, scab, blight, dry rot, disease, insects, or mechanical or other means.

The diameter of potatoes of round varieties shall be not less than 1 1/2 inches and of potatoes of long varieties 1 1/3 inches, but lots of potatoes which are not less than 1 1/2 inches in diameter and which meet the remaining requirements of this grade may be designated "U. S. No. 1, 1 1/2 inches minimum."

In order to allow for variations incident to proper grading and handling, not more than 5 percent, by weight, of any lot may be below the prescribed size. In addition, not more than 5 percent, by weight, may be damaged by hollow heart, and not more than 6 percent may be below the remaining requirements of this grade, but not to exceed one-sixth of this amount or 1 percent shall be allowed for potatoes affected by soft rot.

U. S. No. 2 shall consist of potatoes of similar varietal characteristics which are free from freezing injury and soft rot and from serious damage caused by sunburn, second growth, growth cracks, hollow heart, cuts, scab, blight, dry rot, disease, insects, or mechanical or other means.

The diameter of potatoes of this grade shall be not less than 1 1/3 inches.

In order to allow for variations incident to proper grading and handling, not more than 5 percent, by weight, of any lot may be below the prescribed size and, in addition, not more than 6 percent, by weight, may be below the remaining requirements of this grade, but not to exceed one-sixth of this tolerance or 1 percent shall be allowed for potatoes affected by soft rot.

U. S. Fancy shall consist of potatoes of one variety which are mature, bright, well shaped, free from freezing injury, soft rot, dirt or other foreign matter, sunburn, second growth, growth cracks, hollow heart, cuts, scab, blight, dry rot, disease, insect or mechanical injury and other defects.

The size shall be stated in terms of minimum diameter or minimum weight or of range in diameter or weight following the grade name, but in no case shall the diameter be less than 2 inches.**

In order to allow for variations incident to proper grading and handling, not more than 5 percent, by weight, of any lot may vary from the size stated and, in addition, not more than 6 percent, by weight, of any lot may be below the remaining requirements of this grade, but not to exceed one-sixth of this tolerance or 1 percent shall be allowed for potatoes affected by soft rot.*

DEFINITION OF TERMS

As used in these grades:

"Mature" means that the outer skin (epidermis) does not loosen or "feather" readily during the ordinary methods of handling.

"Bright" means free from dirt or other foreign matter, damage or discoloration from any cause, so that the outer skin (epidermis) has the attractive color normal for the variety.

"Well shaped" means the normal, typical shape for the variety in the district where grown, and free from pointed, dumb-bell shaped, excessively elongated, and other ill-formed potatoes.

"Soft rot" means any soft or mushy condition of the tissue, such as slimy soft rot, wet fusarium or wet breakdown following freezing injury or sunscald.

"Diameter" means the greatest dimension at right angles to the longitudinal axis. The long axis shall be used without regard to the position of the stem (rhizome).

"Free from damage" means that the appearance shall not be injured to

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*Soft rot or other deterioration developing in transit on potatoes otherwise up to grade shall be considered as affecting the condition and not the grade.

**Such statement as the following will be considered as meeting the requirements: "U. S. Fancy, 2 to 3 1/2 inches;" "U. S. Fancy, 10 ounces to 16 ounces;" "U. S. Fancy, 2 inches minimum;" "U. S. Fancy, 10 ounces minimum."
an extent readily apparent upon casual examination of the lot, and that any
damage from the causes mentioned can be removed in the ordinary process
of preparation for use without appreciable waste. Loss of outer skin (epi-
dermis) shall not be considered as an injury to the appearance.
"Badly misshapen" means of such shape as to cause appreciable waste in
the ordinary process of preparation for use.
"Free from serious damage" means that the appearance shall not be
seriously injured to an extent readily apparent upon casual examination of
the lot and that any damage from the causes mentioned can be removed in
the ordinary process of preparation for use without a waste of 10 percent or
more of the total weight.
June 30, 1927.

FRESH PEAS

GRADEs

U. S. No. 1 shall consist of peas of similar varietal characteristics which
are fresh, tender, well filled, firm, of reasonably uniform maturity, free from
excessive moisture, decay, mildew injury, freezing injury and from damage
caused by hail, dirt, leaves or other foreign matter, disease, insects, or
mechanical or other means.
In order to allow for variations incident to proper grading and handling,
not more than 10 percent, by weight, of any lot may be below the require-
ments of this grade but not more than one-half of this tolerance or 5 percent,
shall be allowed for defects causing serious damage, and not more than one-
tenth of this tolerance or 1 percent shall be allowed for decay.
Unclassified shall consist of peas which are not graded in conformity with
the foregoing grade.

DEFINITION OF TERMS

"Similar varietal characteristics" means that the peas in any container
shall be of the same color and general type.
"Reasonably uniform maturity" means that the peas in any container
shall be of about the same stage of maturity.
"Free from excessive moisture" means that the peas shall not be water-
soaked.
"Damage" means any injury from the causes mentioned which materially
affects the appearance or edible quality.
"Serious damage" means any injury that seriously affects the edible or
shipping quality. Peas affected with mildew injury and freezing injury shall
be considered as being seriously damaged.
May 6, 1926.

SWEET PEPPERS

U. S. NO. 1

U. S. No. 1 shall consist of sweet peppers of similar varietal character-
istics (1), which are green but not immature (2), which are well formed (3),
fairly smooth and firm (4), and which are free from damage (5), caused by
sunscald, freezing, disease, insects, hail, scars or mechanical or other means.
In order to allow for variation incident to proper grading and handling
not more than 10 percent, by count, of any lot may be below the requirements
of this grade, but no part of this tolerance shall be allowed for decay.

U. S. NO. 2

U. S. No. 2 shall consist of sweet peppers of similar varietal character-
istics which are green but not immature, which may be slightly missapen
(6), which are firm and free from serious damage (7) caused by sunscald,
freezing, disease, insects, hail, scars or mechanical or other means and from
any defects or injury that has penetrated through the fleshy outer wall of
the pepper.
In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of any lot may be below the requirements of this grade, but no part of this tolerance shall be allowed for decay.

**U. S. NO. 3 (CULLS)**

U. S. No. 3 (Culls) shall consist of sweet peppers which do not meet the requirements of the foregoing grades.

(Numerals in parentheses refer to definitions of terms employed in these grades.)

**RED OR MIXED PEPPERS**

Peppers which conform to the requirements of either U. S. No. 1 or U. S. No. 2 except as to color, if uniformly red or turning red shall be designated “U. S. No. 1 Red” or “U. S. No. 2 Red” or if mixed red and green shall be designated “U. S. No. 1 Mixed” or “U. S. No. 2 Mixed.”

**MARKING REQUIREMENTS FOR SIZE**

The size of peppers in any lot may be stated either in terms of minimum size or in terms of range of sizes. The size of peppers of long, slender varieties such as “Ruby King” shall be designated in terms of length, as “U. S. No. 1—3 inch minimum” or “U. S. No. 1—2½ to 4 inches.”

The size of peppers of short, thick varieties such as “Ruby Giant” shall be designated in terms of diameter (5), as “U. S. No. 1—2¼ inch minimum” or “U. S. No. 1—2 to 3 inches.”

In order to allow for variations incident to proper grading and handling not more than 5 percent, by count, of the peppers in any package, if a minimum size only is given, may be below the minimum size specified, or if a range of sizes is given, may fall outside the range specified.

**DEFINITIONS OF TERMS**

As used in these grades:

1. “Similar varietal characteristics” means that the peppers shall be alike as to type and general characters of the fruit.
2. “Immature” means that the seeds are not fully developed and that the peppers have not reached the stage of maturity which will insure a proper completion of the ripening process.
3. “Well formed” means that the peppers are of the normal, typical shape for the variety. Peppers which are only slightly curved in form shall be permitted in U. S. No. 1.
4. “Firm” means that the pepper is fairly solid and fairly substantial in structure. It may yield slightly to pressure but is not soft, limp or pliable.
5. “Free from damage” means that the peppers are not injured to an extent readily apparent upon examination.
6. “Slightly misshapen” means more than normally grooved, curved or indented. Specimens of the type commonly known as “buttons,” or which are decidedly crooked, constricted or otherwise so seriously deformed as to detract materially from the appearance of the pepper, shall be excluded from U. S. No. 1 and U. S. No. 2.
7. “Serious damage” means surface blemishes covering more than 15 percent of the surface of the pepper in the aggregate, or any deformity so serious as to cause a loss of over 10 percent of the volume of the pepper in the ordinary process of preparation for use.
8. “Diameter” means the greatest dimension at right angles to the longitudinal axis.

It is understood that the development in transit (or after harvesting and packing) of decay, over-maturity and other deteriorating factors that are progressive in their character, shall be considered as influencing condition rather than grade. If a lot of U. S. No. 1 or U. S. No. 2 peppers when received in a terminal market contains no more than 2 per cent, by count, of peppers showing decay nor a total of more than 5 per cent, by count, of
peppers which have deteriorated in condition from any cause, such lot shall be considered a good commercial delivery for the grade.
Nov. 19, 1923.

STRAWBERRIES

GRADES

U. S. No. 1 shall consist of strawberries of one variety, with the cap (calyx) attached, which are firm, not overripe, underripe, or undeveloped; and which are free from mold or decay and from damage caused by dirt, moisture, foreign matter, disease, insects or mechanical or other means. Unless otherwise specified, the minimum size shall be not less than three-quarters of an inch in diameter.

In order to allow for variations other than size incident to proper grading and handling, not more than 10 percent, by volume, of the strawberries in any lot may be below the requirements of this grade, but not to exceed one-half of this tolerance or 5 percent, shall be allowed for defects causing serious damage, and not more than 1/5 of this amount, or 1 percent, shall be allowed for decay.

In addition, not more than 5 percent, by volume, of the strawberries in any lot, may be below the specified minimum size.

Unclassified shall consist of strawberries which are not graded in conformity with the foregoing grade.

DEFINITIONS OF TERMS

As used in these grades:

“Overripe” means dead ripe, becoming soft, a condition unfit for shipment and necessitating immediate consumption.

“Underripe” means so immature that less than two-thirds of the surface of the berry is of a pink or red color.

“Undeveloped” means not having attained a normal shape and development owing to frost injury, lack of pollination, insect injury, or other causes. “Button” berries are the most common type of this condition.

“Damage” means any injury from the causes mentioned which materially affects the appearance, edible or shipping quality.

“Serious damage” means that the strawberries are soft or leaky; or have broken skins. Strawberries which are caked with dirt or which show no pink or red color shall be considered seriously damaged.

“Diameter” means the greatest dimension at right angles to a straight line running from the stem to the apex.

April 7, 1926.

FRESH TOMATOES

U. S. NO. 1

U. S. No. 1 shall consist of tomatoes of similar varietal characteristics which are mature but not overripe or soft; well formed, fairly smooth, which are free from damage caused by sunscald, puffiness, catfaces, growth cracks, freezing, disease, insects, hail, scars, or mechanical or other means.

In order to allow for variations incident to proper grading and handling, not more than a total of 10 percent, by count, of any lot may be below the requirements of this grade but not to exceed a total of 5 percent, by count, may be allowed for tomatoes which are seriously damaged and not more than one-fifth of this amount or 1 percent may be allowed for tomatoes which are affected by decay.

U. S. NO. 2

U. S. No. 2 shall consist of tomatoes which are mature but not overripe or soft, which are free from serious damage caused by sunscald, catfaces, growth cracks, freezing, disease, insects, hail, scars or mechanical or other means and from any defects or injury that has penetrated through the fleshy outer wall of the tomato.

In order to allow for variations incident to proper grading and handling,
not more than a total of 10 percent, by count, may be below the requirements of this grade, but not more than one-fifth of this amount, or 2 percent, may be allowed for decay.

MARKING REQUIREMENTS FOR SIZE

The minimum size, numerical count, or description of pack of the tomatoes in any package shall be plainly stenciled or otherwise marked on the package. “Minimum size” means the greatest diameter of the smallest fruit measured at right angles to a line running from the stem to the blossom end. It shall be stated in terms of whole and quarter inches, as 2 inches minimum, 2¾ inches minimum, 2½ inches minimum, and so on, in accordance with the facts. In order to allow for variations incident to proper sizing, not more than 10 percent, by count, of the tomatoes in any package may be below the minimum size specified.

“Description of pack” applies particularly to California conditions and shall be designated according to the arrangement of the tomatoes in the top layer in a lug as 5-5, 5-6, 6-6, and so on in accordance with the facts. The figures represent the number of rows of tomatoes each way in the lug and it is understood that the two bottom layers of tomatoes in any lug shall not contain more than one additional row each way, i.e., that in 5-5 pack the tomatoes in the two bottom layers must not be smaller than will pack 6 rows each way as 6-6.

DEFINITIONS OF TERMS

As used in these grades:

“Similar varietal characteristics” means that the tomatoes shall be alike as to firmness of flesh and shade of color, i.e., that soft-fleshed early maturing varieties shall not be mixed with firm-fleshed mid-season and late varieties or bright red varieties mixed with varieties having a purplish tinge.

“Mature” means that the contents of the seed cavities have begun to develop a jelly or glue-like consistency and the seeds are fully developed.

“Well formed” means the normal, typical shape for the variety.

“Fairly smooth” means not noticeably ridged, angular, indented or otherwise misshapen.

“Free from damage” means that the tomatoes shall not be injured to an extent readily apparent upon examination.

“Free from damage caused by puffiness”—Tomatoes damaged by puffiness are usually angular, flat-sided and thin-walled. Such tomatoes shall not be considered damaged unless one or more locules are distinctly open.

“Catfaces” means irregular, dark, leathery scars usually found at the blossom end, but sometimes on the sides. If shallow and no greater in total area than a dime they shall be allowed in U. S. No. 1.

“Growth cracks” are ruptures or cracks radiating from the stem end. If well healed over and not longer than ¼ inch they shall be allowed in U. S. No. 1.

“Serious damage” means surface blemishes covering more than 15 percent of the surface in the aggregate or any deformity so serious as to cause a loss of over 20 percent in the ordinary process of preparation for use.

Revised March 11, 1926.

WATERMELONS

U. S. NO. 1

U. S. No. 1 shall consist of watermelons of similar varietal characteristics which are mature but not overripe, well formed, and free from decay, white-heart, anthracnose and from damage caused by other disease, sunburn, insects, or mechanical or other means. (See size requirements.)

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, may be below the requirements of this grade but no part of this tolerance shall be allowed for decay and not more than 1/5 of the total tolerance or 2 percent, may be badly misshapen or seriously damaged by any means.
U. S. NO. 2

U. S. No. 2 shall consist of watermelons of similar varietal characteristics which are mature but not overripe, which are not badly misshapen and which are free from decay, white-heart, and from serious damage caused by sunburn, disease, insects or mechanical or other means. (See size requirements.)

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, may be below the requirements of this grade, but no part of this tolerance shall be allowed for decay.

UNCLASSIFIED

Watermelons which are not graded in conformity with either of the foregoing grades may be designated as Unclassified.

SIZE

Where the size of watermelons is stated in terms of average weight, Unless Otherwise Specified, the melons in any lot averaging less than 30 pounds shall not vary more than 4 pounds below the stated average, and the melons in any lot averaging 30 pounds or more shall not vary more than 6 pounds below the stated average.

Size may also be stated in terms of minimum weight.

In order to allow for variations incident to proper sizing, not more than 5 percent, by count, of the watermelons in any lot may be below the size requirements.

TABLE OF WEIGHTS

<table>
<thead>
<tr>
<th>Average Weight</th>
<th>Minimum Weight (Unless Otherwise Specified)</th>
<th>Tolerance Permitted for Melons Below the Minimum Weight</th>
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<tbody>
<tr>
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<tr>
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<td>42</td>
<td>36</td>
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</tr>
</tbody>
</table>

DEFINITIONS OF TERMS

As used in these grades:

"Mature" means having reached the stage of development at which the melon is palatable.

"Well formed" means having the characteristic shape but not necessarily the perfect shape of the variety.

"Not badly misshapen" means that the melons are not bottlenecks or gourdnecks, but may be tapered at the ends or slightly constricted.

"Free from damage" means that the melons are not injured to an extent readily apparent upon examination. Melons showing a greenish yellow sunburned spot not larger than 9 inches square shall not be considered as damaged, but melons showing sunburn in excess of this amount or which show any pronounced golden yellow color shall be regarded as damaged.

"Serious damage" means any injury which affects the edible quality of the melon or which detracts materially from its appearance. Melons showing sunscald are regarded as seriously damaged. Melons showing not more than 15 flatly elevated anthracnose spots which are not cracked or pitted shall not be considered as seriously damaged.

August 12, 1925.