August 2017

Marketing Iowa cantaloupes

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MARKETING IOWA CANTALOUPES

By
A. T. ERWIN
GEOFFREY SHEPHERD
N. D. MORGAN

AGRICULTURAL EXPERIMENT STATION
AND MECHANIC ARTS
IOWA STATE COLLEGE OF AGRICULTURE
R. E. BUCHANAN, DIRECTOR
VEGETABLE CROPS AND AGRICULTURAL ECONOMICS SUBSECTIONS
AMES, IOWA

Published by Iowa State University Digital Repository, 1938
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SUMMARY

The chief factors affecting the quality and marketing of Iowa cantaloupes are summarized as follows:

1. Iowa, in relation to other producing sections, is classed as a late crop area. Other areas which compete for the same terminal markets are Indiana, Michigan and Colorado.

2. The Iowa crop normally matures under total effective temperature, ranging from 2,100 to 2,400° F.

3. Hale’s Best and the various strains thereof constitute the leading commercial varieties.

4. Proximity to market, hence the short time enroute, enables the Iowa grower to leave the melons on the vine until they reach the maximum sugar content, “or the full slip.” This means that the sugar content, and therefore quality of the melons, is inherently high when they are picked.

5. Iowa cantaloupe growers have the advantage of proximity to their consumers; most of the crop is sold within a radius of 150 miles. Transportation costs, therefore, are comparatively low, and the prevalence of trucking means that the distributing system is very flexible.

6. The advent of surfaced highways has shifted the mode of transportation from the railroad to motor trucks.

7. The crop is extremely perishable; it moves rapidly when ripe. This fact, combined with a lack of accurate local market information, places the individual grower in a weak bargaining position.

8. The marketing period for the Muscatine area is very short, ranging from 1 month to 6 weeks, a comparatively short time in which to establish a place on the terminal markets.

9. In general there is a marked decline in melon prices from midseason to the close. Iowa’s melon crop comes on to the market toward the end of the season on what is, in general, a “bear market.”
10. The shift in transporting agencies has effected a change in selling agencies. Upwards of 90 percent of the Muscatine Island crop is now sold through the truck peddler.

11. Prices received by the better class of growers from the truck peddler for bulk sales correspond in general with terminal market prices after making deductions for transportation and handling charges.

12. Most of the crop is marketed in bulk by truck in a hit-and-miss unorganized fashion. This has an adverse effect on the quality of the fruit after it is picked, because of deterioration in transit as a result of the inadequate transportation facilities of the truck peddler.

13. Cooperative marketing, though locally confronted with a number of difficulties, if combined with the selling of other crops from this area, and if necessary supplies, such as insecticides, fertilizers and containers, were purchased cooperatively, should result in advantages to the growers.
Cantaloupe production is well adapted to the sand land areas. This type of soil, though not well adapted to corn and general farm crops, may be advantageously devoted to cantaloupe growing.

Cantaloupe marketing in Iowa presents a number of interesting and complex problems. These include consideration of varietal adaptation, the temperature factor, changes in transporting and selling agencies and competing areas of production. The objective of this bulletin is to show clearly what these problems are and to suggest possible methods of meeting them.

The data used as a basis for the study presented in this bulletin are drawn from three sources: 1. The records of the Muscatine Island Field Station, which is operated cooperatively by the Iowa Agricultural Experiment Station and the Muscatine Island Truck Growers Association; 2. information obtained direct from growers, truck peddlers and commission merchants; 3. federal market reports and crop production statistics.

The senior author spent the past three cantaloupe marketing seasons in the field gathering data by direct contact with the sources indicated above. The economic interpretation of the data was made by the second author in close collaboration with the senior author.

SAND LAND AREAS IN IOWA

Muskmelons succeed on a wide diversity of soils, but the best quality melon is produced on sandy soils. The principal sand land areas are found in southeastern Iowa. The largest single area is in Louisa and Muscatine counties, followed by Black Hawk, Butler, Buchanan, Chickasaw, Lee, Polk, Johnson and

1 Project 315 of the Iowa Agricultural Experiment Station. The terms “cantaloupe” and “muskmelon” are used synonymously in the trade. Technically, cantaloupes are a foreign type of smooth-skinned muskmelon with a hard rind and are classified botanically as Cucumis melo var. Cantaloupensis. The term muskmelon is more descriptive, i.e., a melon with a musk odor; however, both terms are so well established in the trade as to render any discrimination in the use of the two words futile.
Pottawattamie, comprising a total of approximately 50,000 acres. For 1929 the counties having 100 acres or more of muskmelons were: Lee, 180 acres; Muscatine, 678 acres; Polk, 228 acres.²

CANTALOupe PRODUCTION IN IOWA AND THE UNITED STATES

The production of cantaloupes has shifted markedly during the past 10 years. The acreage trend for the United States is shown in fig. 1.

COMPETING REGIONS

The commercial cantaloupe regions of the United States are divided into four groups; namely, early, second early, intermediate and late crop. The chief regions included in these four groups which supply Iowa markets or compete with the Iowa crop on the terminal markets are indicated according to acreage and production for the years 1928–36 in table 1.

Some changes have taken place within the totals shown for the United States. Production in California, which produces

![Graph showing cantaloupe acreage in the United States, 1928-36.](http://lib.dr.iastate.edu/bulletin/vol33/iss373/1)

² Iowa Crop and Weather Service.
# TABLE 1. CANTALOUPE ACREAGE AND PRODUCTION IN THE UNITED STATES.*

<table>
<thead>
<tr>
<th>Group and state</th>
<th>Acreage</th>
<th>Production (1,000 crates; 1928</th>
<th>1934</th>
<th>1935</th>
<th>1936</th>
<th>1928</th>
<th>1934</th>
<th>1935</th>
<th>1936</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calif., Imperial</td>
<td>33,460</td>
<td>27,900</td>
<td>28,650</td>
<td>24,150</td>
<td>6,224</td>
<td>4,464</td>
<td>3,639</td>
<td>3,743</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>920</td>
<td>300</td>
<td>200</td>
<td>200</td>
<td>37</td>
<td>18</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34,380</td>
<td>28,200</td>
<td>28,850</td>
<td>24,350</td>
<td>6,261</td>
<td>4,482</td>
<td>3,651</td>
<td>3,755</td>
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<tr>
<td><strong>Second early:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>10,000</td>
<td>5,700</td>
<td>10,000</td>
<td>11,500</td>
<td>800</td>
<td>855</td>
<td>1,400</td>
<td>1,610</td>
<td></td>
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<tr>
<td>Arkansas</td>
<td>6,000</td>
<td>2,550</td>
<td>2,500</td>
<td>2,000</td>
<td>504</td>
<td>120</td>
<td>150</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>12,050</td>
<td>9,750</td>
<td>11,850</td>
<td>9,900</td>
<td>470</td>
<td>1,736</td>
<td>2,145</td>
<td>1,522</td>
<td></td>
</tr>
<tr>
<td>N. Carolina</td>
<td>2,310</td>
<td>3,600</td>
<td>3,600</td>
<td>3,800</td>
<td>261</td>
<td>216</td>
<td>252</td>
<td>228</td>
<td></td>
</tr>
<tr>
<td>S. Carolina</td>
<td>1,450</td>
<td>1,500</td>
<td>3,200</td>
<td>3,300</td>
<td>56</td>
<td>90</td>
<td>264</td>
<td>165</td>
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<tr>
<td>Texas</td>
<td>1,570</td>
<td>4,800</td>
<td>6,000</td>
<td>6,350</td>
<td>141</td>
<td>254</td>
<td>280</td>
<td>286</td>
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</tr>
<tr>
<td><strong>All others</strong></td>
<td>400</td>
<td>3,200</td>
<td>6,120</td>
<td>6,860</td>
<td>146</td>
<td>163</td>
<td>331</td>
<td>469</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td>33,970</td>
<td>31,400</td>
<td>43,370</td>
<td>43,710</td>
<td>5,428</td>
<td>3,444</td>
<td>4,932</td>
<td>4,690</td>
<td></td>
</tr>
<tr>
<td><strong>Intermediate:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delaware</td>
<td>2,200</td>
<td>3,090</td>
<td>3,460</td>
<td>3,500</td>
<td>297</td>
<td>433</td>
<td>519</td>
<td>368</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>900</td>
<td>1,100</td>
<td>829</td>
<td>1,000</td>
<td>97</td>
<td>77</td>
<td>41</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Indiana</td>
<td>4,640</td>
<td>5,800</td>
<td>6,500</td>
<td>7,000</td>
<td>524</td>
<td>609</td>
<td>390</td>
<td>420</td>
<td></td>
</tr>
<tr>
<td>Maryland</td>
<td>6,040</td>
<td>1,400</td>
<td>8,500</td>
<td>8,100</td>
<td>676</td>
<td>962</td>
<td>787</td>
<td>770</td>
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</tr>
<tr>
<td>New Mexico</td>
<td>1,140</td>
<td>1,200</td>
<td>1,100</td>
<td>1,100</td>
<td>189</td>
<td>143</td>
<td>117</td>
<td>148</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>1,750</td>
<td>2,000</td>
<td>2,200</td>
<td>2,700</td>
<td>192</td>
<td>250</td>
<td>187</td>
<td>520</td>
<td></td>
</tr>
<tr>
<td><strong>All others</strong></td>
<td>470</td>
<td>300</td>
<td>250</td>
<td>200</td>
<td>33</td>
<td>21</td>
<td>19</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17,400</td>
<td>20,590</td>
<td>22,830</td>
<td>23,600</td>
<td>2,098</td>
<td>2,495</td>
<td>2,251</td>
<td>2,502</td>
<td></td>
</tr>
<tr>
<td><strong>Late:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
<td>9,000</td>
<td>3,380</td>
<td>6,240</td>
<td>7,800</td>
<td>1,170</td>
<td>372</td>
<td>1,030</td>
<td>1,170</td>
<td></td>
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<tr>
<td>Iowa</td>
<td>750</td>
<td>700</td>
<td>700</td>
<td>500</td>
<td>78</td>
<td>47</td>
<td>60</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Michigan</td>
<td>3,000</td>
<td>4,830</td>
<td>4,900</td>
<td>4,900</td>
<td>300</td>
<td>435</td>
<td>710</td>
<td>564</td>
<td></td>
</tr>
<tr>
<td>New Jersey</td>
<td>3,000</td>
<td>6,000</td>
<td>4,900</td>
<td>4,900</td>
<td>480</td>
<td>690</td>
<td>539</td>
<td>366</td>
<td></td>
</tr>
<tr>
<td><strong>All others</strong></td>
<td>670</td>
<td>2,000</td>
<td>2,190</td>
<td>2,550</td>
<td>93</td>
<td>237</td>
<td>279</td>
<td>269</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16,450</td>
<td>16,910</td>
<td>19,230</td>
<td>20,050</td>
<td>2,121</td>
<td>1,781</td>
<td>2,618</td>
<td>2,401</td>
<td></td>
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<tr>
<td><strong>Total all states</strong></td>
<td>102,340</td>
<td>97,500</td>
<td>114,280</td>
<td>111,710</td>
<td>15,834</td>
<td>12,292</td>
<td>13,452</td>
<td>13,148</td>
<td></td>
</tr>
</tbody>
</table>


The four groups named — early, second early, intermediate and late — do not come on the market in four separate periods, with gaps in between; they overlap, making not only a continuous but also an overlapping series. The fruit from one crop (the intermediate, for example) tapers off toward the end of its season but is still coming on the market when the fruit from the late season crop begins to arrive. This situation is illustrated in fig. 2, which shows how the fruit from Indiana and Illinois (which are classified in the intermediate crop group) is still about half the total United States crop, has been declining. This decline has been offset by increases in several other states. The acreage in Michigan, one of Iowa's closest competitors, has been increasing. Cantaloupe production, rather than becoming more and more centralized in one or two important areas, such as California, seems to be moving toward decentralization. The position Iowa occupies with respect to other states, the marketing period of which runs parallel to hers, is shown in fig. 2.
coming on the market in some volume when the fruit from Iowa, Colorado and Michigan (which are late crop states) begins to arrive.

As will be noted by fig. 2, the Illinois and Indiana crop is tapering off about the time the Iowa crop comes on. Colorado's Rocky Fords come on to the market about the same time as the Iowa crop and continue after the close of the Iowa season. Michigan occupies much the same season as Iowa but has the advantage of proximity to a number of large terminal markets and possesses a number of successful cooperating marketing organizations which are equipped to grade, pack and label their goods.

Iowa cantaloupes are sold almost at the close of the season. This does not mean, however, that Iowa has a monopoly position at that time. Cantaloupes from other states, for example Colorado, come in greater volume at the same time. Iowa also gets competition from three nearby states—Illinois, Indiana and Michigan—the melons of which come on the market during some portion of Iowa's marketing season. These nearby states do not have the freight handicap of the western states; in fact, they are closer to the terminal markets than Iowa.

**IOWA A DEFICIENCY PRODUCING AREA**

Iowa is a deficiency producing area in cantaloupe production. That is, it doesn't produce enough melons to supply its own needs. This situation is evidenced by carlot unloads\(^3\) for 1936


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for the months of August and September, the harvesting period for the Iowa crop. The situation in 1936 was typical of other years.

**Carlot Unloads of Cantaloupes**

<table>
<thead>
<tr>
<th>Location</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Des Moines</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Omaha</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>St. Paul</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Kansas City</td>
<td>38</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>83</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

* Includes Honey Balls and melons of this class.

**MUSCATINE AREA**

The largest single area in Iowa devoted to muskmelon production is found in Muscatine and Louisa counties. For this reason this region, commonly known as the Muscatine area, was selected for the muskmelon marketing study presented in this bulletin.

**EARLY HISTORY**

The first white settlement on Muscatine Island dates back to 1836 (19) when the prairie schooners crossed the Mississippi and persuaded the Mascoutin Indians to relinquish their claim to this region. Corn was the first crop grown on the Island and with so little success that it became a trite saying that when a farmer moved to the Island he was taking a short cut to the poorhouse. To begin with, the sandy soil was not adapted to general farming. Drouths were frequent, and in some years the farmer was flooded out, as the Mississippi River levees did not yet exist.

Irrigation, which is now widely practiced on the Island, appears to have made a start in the severe drouth years of the '90's, when Chas. B. Vail induced the Rock Island railroad to send a rainmaker to the town of Fruitland. According to tradition, for a week the rainmaker bombarded the sky with smoke and chemicals with no results. Undaunted, Mr. Vail turned from the sky to the earth, where at a depth of 10 feet there is
Fig. 3. Map of Muscatine Island.
an unlimited water supply. He drove the first irrigation well on the Island in 1893 (1).

In the early '60's melons and other truck crops gained a place on the Island. The first car of cantaloupes was shipped from the Island in 1862 by James Wiggans (20). By 1896 (20) the volume had increased to 700 cars, which included watermelons. For a considerable period the steamboat was the principal agency of transportation, and St. Louis was the most important market.

SOIL TYPE AND TOPOGRAPHY

The Muscatine Island area comprises approximately 21,000 acres lying immediately south of the city of Museatine. The Island is bounded on the east by the Mississippi River and on the west by the Museatine slough, an ancient river channel bordering the bluffs. In shape roughly semi-elliptical, it has a maximum width of 5 miles, is 11 miles in extreme length, has an average elevation of approximately 545 feet and a fairly flat topography. The soil for that portion of the Island devoted to melons is classified as Buckner sands. The top soil is from 18 to 20 inches in depth and is a dark brown or black loamy sand. The subsoil is gravelly, causing excessive drainage. The waterholding capacity of the soil is also rather low — 19 percent, as compared with 36 percent for the Carrington loam of central Iowa.

The normal annual rainfall is 32.5 inches, approximately half of which falls during the growing season. The seasonal distribution of the rainfall for the Museatine area is shown in fig. 4.

TEMPERATURE

The monthly mean temperature for the Muscatine area for the growing season is as follows.

<table>
<thead>
<tr>
<th>Mean Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
</tr>
<tr>
<td>June</td>
</tr>
<tr>
<td>July</td>
</tr>
<tr>
<td>August</td>
</tr>
<tr>
<td>September</td>
</tr>
</tbody>
</table>

4 All climatological data referred to in this publication are from the U. S. Weather Bureau.
The length of the growing season is determined by the latest killing frost of spring and the first frost of autumn. These dates vary somewhat from year to year, but for the area in question spring frosts rarely occur after May 1 and autumn frosts may be expected early in October, which provides a growing season of approximately 150 days.

CONESVILLE SECTION

The Conesville section, which is also an important cantaloupe area, is located in the southwest corner of Muscatine County, some 15 miles west of Muscatine Island and at the junction of the Iowa and Cedar rivers.

The soils of the Conesville area devoted to melons differ from those of the Muscatine Island in that they are less sandy and more loamy in character. In general they run higher in organic matter, leaching is not so pronounced, they are not so "quick" as the Island soil, and generally the cantaloupes ripen from a week to 10 days later than do the Island melons. The surface soil, approximately 1 foot in depth, is a friable silt loam, grayish brown and contains a moderate amount of fine sand. The subsoil is a light brown, silty clay loam, rather compact and generally uniform through a 3-foot section.
IRRIGATION

Drouth and accompanying high temperatures bear an important relation to the production and marketing of cantaloupes. If the crop suffers from lack of moisture, the maturing of the melons is definitely delayed; if the drouth becomes too severe, the crop is lost. In the Muscatine region the danger of drouth is eliminated by irrigation.

The stage of development at which the water is applied to the melon plants is also an important factor. In the early stages of development an ample and even moisture supply is very advantageous. Water, if applied too liberally to a fertile soil during the period of active growth, tends to induce an excessive vine growth and may delay fruiting. An over-supply of water, either from rainfall or irrigation, is a serious detriment when the melons are reaching maturity. The following record is an example: One of the Muscatine plots received in 1934 three irrigations in July and one the first week in August. In the first 4 days following the last irrigation there was a rainfall of 2½ inches. This situation resulted in 35 percent of the melons cracking. Under these conditions, the sugar content is also likely to be reduced. The major portion of the crop was jumbo melons, too large for crating.

WIND DAMAGE

Damage from spring winds is often a serious factor in melon production in the Muscatine area. This injury results from the blowing of the sand and occurs when the plants are very small and tender, and the loss may be such as to necessitate replanting, which in turn tends to delay the time of harvesting. On the Field Station plots in 1934, for example, the original stand was lost by wind damage, resulting in a replant. This was done on June 4. The harvesting on this plot began Aug. 22, approximately 3 weeks late for that season. Windbreaks are, therefore, an important factor in muskmelon production on sandy soils.

DISEASES AND INSECT DAMAGE

Leaf spot and bacterial wilt affect the foliage seriously in certain seasons in the Muscatine area, cutting short the harvest period and also impairing the quality of the melons. Diseased
vines cause the fruit to ripen prematurely. Such specimens are known as “slickers,” because of their deficient netting. Melons of this type have not developed normally and are of a spongy consistency and a poor flavor. They are entirely unfit for marketing, and the sale of such goods is a serious detriment to the industry.

**SEASON OF MATURITY**

The price of cantaloupes is normally highest in early summer. As the season progresses, the price curve gradually moves downward, tending to flatten out during the midseason harvest in the central Mississippi Valley. Hence, the season of maturity of a given variety and the period at which the bulk of its fruit is harvested are points of special interest to the grower. In table 2 is presented a selected list of varieties with the percentage of the fruit which matures in the first and second half of the season. This table is based upon only 1 year’s results at the Muscatine Island Field Station (1935), so the yields given indicate the productiveness of the different varieties only in a general way. The relative position, however, as to time of maturity of the different varieties varies less than seasonal yield. Honey Ball, for example, may change its relative position with other varieties from year to year as to yield, but in time of maturity it is always a late melon.

<table>
<thead>
<tr>
<th>Variety</th>
<th>First half of harvest period</th>
<th>Second half of harvest period</th>
<th>Yield of dozens per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hale’s Best</td>
<td>17</td>
<td>83</td>
<td>257</td>
</tr>
<tr>
<td>Milwaukee Market</td>
<td>15</td>
<td>85</td>
<td>108</td>
</tr>
<tr>
<td>Mildew Resistant No. 45</td>
<td>14</td>
<td>86</td>
<td>256</td>
</tr>
<tr>
<td>Cantadew</td>
<td>12</td>
<td>88</td>
<td>195</td>
</tr>
<tr>
<td>Honey Rock</td>
<td>12</td>
<td>88</td>
<td>216</td>
</tr>
<tr>
<td>Bender’s Surprise</td>
<td>11</td>
<td>89</td>
<td>125</td>
</tr>
<tr>
<td>Superperfecto</td>
<td>10</td>
<td>90</td>
<td>288</td>
</tr>
<tr>
<td>Tip Top</td>
<td>9</td>
<td>91</td>
<td>116</td>
</tr>
<tr>
<td>Pearly Pink</td>
<td>7</td>
<td>93</td>
<td>263</td>
</tr>
<tr>
<td>Honey Dew</td>
<td>0</td>
<td>100</td>
<td>128</td>
</tr>
<tr>
<td>Weaver Special</td>
<td>0</td>
<td>100</td>
<td>157</td>
</tr>
</tbody>
</table>

**FIELD PRACTICES FOR EARLY MATURITY**

Since cantaloupe prices are highest in the forepart of the season, field practices which would bring them to maturity earlier

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5 See fig. 15, page 134.
than at present might improve growers' returns. Under Iowa conditions, two methods are available. One is the use of transplants, in which case the plants are started in blocks of sod or in plant boxes and transferred to the field when the danger of frost is past. The other is the use of plant protectors, in which case the hills are covered with a transparent canopy of some kind until the vines begin to run.

Observations of results obtained by Muscatine Island growers who use either of the above mentioned methods indicate that under favorable conditions they afford two important advantages. One of these advantages is early maturity, which gives the grower a chance at the higher prices; the other is a better stand, with higher yields, as a result of protection from insect and wind damage.

Inability to forecast spring weather conditions makes it impossible to determine in advance when these advantages are likely to be great enough to justify their cost. The advantages of protection from weather hazards and insect depredations at the germination stage are rather definite. The results expected from the early maturing of fruit are open to question. In the case of plant protectors the difference in the time of appearance of first blossoms was not more than 2 to 3 days, which difference tended to disappear as the season advanced. The use of transplants involves considerable additional labor and expense. Their use may pay for a limited portion of the crop, but is hardly likely to be a profitable practice for the commercial crop as a whole.

QUALITY IN MELONS

The three internal factors which determine edible quality in melons are sweetness, texture and flavor. The sugar content, as shown by Chace, Church and Denney (2), may be estimated by determining the soluble solids in the juice from the edible part by means of a hydrometer. “The solid content of the juice of good melons was decidedly greater than that of the juice of less desirable melons, and the juice of melons which are mature when picked should have a specific gravity of at least 1.040, equivalent to 10 percent solids.”

A mature melon carries the maximum sugar content, and the percentage of sugar does not increase after the fruit is picked.
Standards as to the percentage of solids or sugar content vary widely in different regions. Colorado has adopted a minimum of 10 percent, California 9 percent and Maryland 8 percent. The United States Department of Agriculture, Bureau of Markets, has no standard as to the percentage of sugar in relation to grades of muskmelons.

The texture of a melon may improve after picking, because of "mellowing," during which there is a breaking down of the fibrous tissue, accompanied by a softening of the flesh.

Flavor is an elusive term and one not easily defined. As applied to cantaloupes it includes a peculiar musk odor characteristic of a ripe specimen of high quality and a taste gratifying to the palate.

EXTERNAL INDICATORS OF MATURITY

Denney (2) has shown that there is a correlation between the refractive index and sugar content, and by means of an immersion refractometer he established a numerical value corresponding to the various stages of development of the fruit. Neither the hydrometer nor refractometer methods are practicable under field conditions, and the question comes back to one of the external characters as a means of determining maturity.

When is a muskmelon ripe? Experience, skill and judgment are involved in picking melons. There are no hard and fast rules for determining ripeness, but certain suggestions may prove helpful.

The five external characteristics which are associated with maturity in the cantaloupe are: 1. Abscission layer, 2. color of pedicel, 3. ground color, 4. netting and 5. aroma.

ABSCISSION LAYER

Abscission or separation of the base of the stem from the fruit, indicated by the formation of a crack between the stem and melon, is known as "on the full slip." A fairly definite line of demarcation between the stem base and the fruit appears when the melon becomes mature. (See fig. 5 on next page.)

STEM CHARACTER

The color of the base of the pedicel or stem of an immature melon is deep green. As the melon approaches maturity, the
green fades out and this portion of the stem assumes a water cored or waxen appearance.

In numerous field counts on the variety Hale’s Best, made in 1933, it was found that melons grading first, as determined both by sampling and hydrometer readings as to quality, developed waxen stems as a preliminary to abscission in 90 percent of the specimens. Chace et al (2) found that melons with translucent or waxy stems were riper than those with green stem bases as judged by the refractive index and also that seeds from melons with waxen stems gave a distinctly weaker starch test than those from green stems, showing that they were more mature. The development of a waxen stem base, while not an infallible guide, is a very useful character to use in picking melons, particularly for distance shipments. In case of the local market, the melons should not be picked until they are “on the full-slip,” i. e., until the stem readily separates from the fruit, which follows the waxen stage.

GROUND COLOR

Other exterior changes in color also occur. The ground color which shows through between the web of netting gradually changes from a dark green to a yellow-green, then to yellow. Chace et al (2) found that 33 percent of the melons with a green ground color carried a satisfactory sugar content; hence the authors concluded that “melons could not be rejected because the ground color was green.” The variety and locality under consideration are probably important factors in this regard. In
the case of salmon-fleshed varieties, such as Hale’s Best, under Iowa conditions the authors regard a yellow ground color as one of the important external indicators of maturity.

In the case of watermelons, the color of the “ground spot” or the portion coming in contact with the earth, is often regarded as an important character in determining maturity. Such was not found to be the case with cantaloupes in numerous observations made by the authors. The under surface changes in color along with the entire surface area and cannot be differentiated in a definite way as a “ground spot.”

NETTING

The netting begins to form as the fruit approaches full size, at first as low flat ridges with furrows down the center. As the melon reaches maturity, these furrows fill in with corky tissue and the ridging becomes pronounced. The netting is completed before the stem abscises.

AROMA

Aroma or fragrance is probably due to certain volatile substances and is an elusive characteristic which defies standards. In a well-ripened melon the musk-like fragrance is present and makes an appeal to the consumer.

Probably no one external characteristic can be relied upon implicitly in determining maturity, and the experienced picker will use all the above mentioned earmarks in selecting mature melons. However, the “slip” is one of the more important external characteristics and the one easiest to follow. In order to insure melons of the highest quality, it is necessary to leave the fruits on the vine until they are on the “full slip.” These melons, however, will not hold up so long as those harvested before fully ripe.

The grower is confronted, therefore, with the problem of harvesting his melons at that stage of maturity when they are at their highest quality consistent with holding up sufficiently well to enable the dealer to market them without undue loss from over-ripeness. The degree of maturity which the fruit is permitted to reach previous to harvesting is determined by the period of time elapsing between harvesting and consumption. The longer this period, the less mature the melons must be at time of picking.
The loss on long-distance shipments of full-slip melons is heavy, ranging as high as 51 percent, according to McKay et al (10), and they, therefore, conclude that “it is necessary that muskmelons be picked before they are entirely ripe in order to provide the essential keeping quality in transit.” In this respect the home grower has a definite advantage, in that the melons may be permitted to become fully mature or “on the full-slip” before harvested. With rare exception, Muscatine melons are transported by truck to their most distant markets and delivered in from 10 to 12 hours.

QUALITY OF HOME-GROWN VS. SHIPPED-IN MELONS

Sherman et al (18), in a marketing study of muskmelons, found that on the terminal markets higher prices are paid for western melons grown under irrigation than those grown under rainfall. This price difference was attributed to variations in quality of the latter, due to changes in temperature, rainfall and sunshine and to the “unattractive white sides which characterize most melons grown under rainfall, especially in a wet season.” Sherman’s statements are not applicable to Muscatine melons, however, since the crop is grown under irrigation, and “white sides” do not occur in this district.

The Iowa melon grower may be subject to criticism on the grounds of careless handling, but the contention that rain-belt melons are inherently inferior in quality is baseless. In fact, if the Iowa grower could be induced to give the same amount of care to the production and marketing of his crop and back it with an equal amount of advertising, as is done in the far west, he could provide the local consumer with an article of quality distinctly superior to the long distance shipped melons, for the reason that “shipping quality and eating quality are more or less opposed,” and in the case of long distance shipments the shipping quality must inevitably receive consideration.

Quality in muskmelons is first of all a matter of high sugar content. “A Brix (hydrometer) reading of 9 percent or less may be considered unsuitable for marketing,” conclude Chace et al (2). During the seasons of 1932, 1933 and 1934, sugar determinations by means of hydrometer readings were made of melons.
on the “full slip” on the variety Hale’s Best from crops grown on a typical melon soil at Muscatine and also at Ames, all of which ran more than 10 percent. This is definitely above the sugar standard of western melons found on our markets.

In response to a questionnaire to Iowa hotelkeepers throughout the state, 80 percent of them expressed a preference for home-grown melons because they were superior in quality. One of the leading commission firms of the state reports, “We have received from a southeastern Iowa grower shipments of melons well graded and crated and in quality equal to any produced nationally.”

VARIETAL FACTOR

What constitutes a desirable variety of muskmelon? The answer involves productiveness, season of maturing, edibility, carrying quality, eye appeal and size of fruit. These are factors which should determine the selection of varieties for a given locality.

Productiveness, from the grower’s point of view, is one of the first essentials of a variety. No matter how many excellent qualities it may have in other respects, a variety must first of all be a good bearer.

The matter of early maturing varieties in order to get on to the market as soon as possible is an important consideration.

No one variety combines all of the characters of an ideal melon. A certain variety may rate particularly high in edibility but lack productiveness or shipping character; hence the grower must choose a middle ground and select a variety which combines a reasonably high eating quality with other essential features of a commercial melon.

A number of varieties of melons rate well for the home garden or local market but have a rind which is too tender in texture to withstand the necessary rehandling incident to the movement of the crop.

Eye appeal is an important factor in the selection of varieties from the long list available to the grower. From the standpoint of flesh color there are two general classes of cantaloupes; namely, green-fleshed and salmon-fleshed. Green-fleshed melons are regarded by many growers as the sweeter, while the salmon-
tinted possess a more pronounced musk aroma and have a decided advantage in color appeal, a factor which plays an important role. Consequently, the salmon-fleshed have entirely supplanted the green-fleshed melons on many of the larger markets.

Consumer preference also has established a demand for a smaller type of melon than was formerly produced. Half a medium sized melon, or a specimen measuring approximately 5 inches in diameter and weighing from 2 to 3 pounds, is preferred to slices of a larger melon. If the blossom and stem ends are trimmed off and the melon cut at right angles to the ends, the halves rest securely on the serving plate and are more convenient to handle than quarters.

The present day varieties are more heavily netted than the older sorts and are globular rather than oblong in shape. They also have a thicker flesh and smaller seed cavity than those of 25 years ago.

In the course of this investigation consideration was given to the varietal factor. One hundred twenty-nine varieties (which included numerous synonyms), listed by seed firms doing business in this section, were studied from the standpoint of edibility, season of maturity, yield and shipping quality.

The terms small, medium and large fruited varieties as used herein are relative only and hence cannot be defined within exact limits. Hale's Best, which has a fruit ranging from 2 to 3 pounds, is classed as a medium sized melon. Being the leading commercial variety of the area in question, it is used as the standard or check against which other varieties are compared.

**TYPES OF MUSKMELONS**

Since many of the varieties possess certain taxonomic characters in common and differ only in minor details, a varietal study may be simplified by grouping under a given type the kinds sharing certain characteristics. The name assigned to each type is, so far as practicable, that of the leading commercial variety (for this region) of the group comprising the type. The list named herewith is by no means a complete enumeration of all the varieties grown in the United States nor has any consideration been given to the matter of synonymy.

The type classification here used is based upon the form of the fruit and embraces four groups. The form of some of the
varieties is intermediate or variable, which leaves their classification open to question.

Conspectus of Cultivated Types of *Cucurbita melo* var. reticulatus

- Fruits clavate — Banana type
- Fruits oblong — Defender type
- Fruits oblate — Hackensack type
- Fruits globular — Hale's Best type

The field notes given under certain varieties of each type embrace only those which have received consideration by the growers in this section.

**Banana Type**

- Fruits 12 to 18 inches in length and 4 to 5 inches in diameter at the base. Flesh firm, fine grained, light salmon color and with slight banana-like flavor. Varieties of this group are a novelty and on account of their peculiar shape cannot be packed satisfactorily; hence they have but little commercial value.

**Defender Type**

- Fruits oblong, ribbing, irregular, netting moderate or absent, size medium to large, flesh salmon-tinted. Grown only for home, garden and local market.

**Varieties**

- Acme, Baltimore, Bay View, Bender's Surprise, Burrell's Gem, Defender, Improved Yellow, Miller's Cream, Osage, Paul Rose, Tip Top.

**Defender**

Distinctly oval in shape, weight 4 to 5 pounds, sutures distinct and heavily netted. Flesh salmon-tinted, seed cavity triangular shaped. This melon was at one time a favorite in
the Muscatine district but has given way to Hale’s Best, which is preferred because of the smaller sized and globular shaped fruits.

Osage

Tendency to crack in wet weather; flesh rather tender and easily bruised when fully ripe. Not a good keeper. Like the Defender, this variety has been largely displaced in the Muscatine area by varieties of the Hale’s Best type.

Hale’s Best Type

In this type are both green-fleshed and salmon-tinted varieties. Fruits globular, small to medium size, moderately ribbed, distinctly netted. Seed cavity medium to small, flesh medium to thick. Season of maturity early to mid-season. The melons comprising this type embraces the leading commercial varieties of the United States.

Varieties

*Salmon-fleshed*
- Cantaloupe Breeder’s Special
- Globe de Oro
- Golden Champlain
- Hale’s Best (“H. B.”)
- Hearts of Gold
- Honey Rock
- Hoodoo
- Mildew Resistant No. 45
- Pearly Pink
- Superperfecto
- Sugar Rock
- Weaver Special
- White Knight

*Green-fleshed*
- Cantadew
- Jade Beauty
Cantadew

Cantadew is an “H. B.” and Honey Ball cross developed by the Botany and Plant Pathology Section of the Iowa Agricultural Experiment Station. Fruit medium sized, moderately netted, dark green ground color. Flesh green, flavor sweet and agreeable. Season 10 days later than that of “H. B.” This variety has made a good showing in southeastern Iowa and its deferred maturity is an advantage in prolonging the shipping season. Its chief faults are its green flesh and its tendency to crack in wet weather.

Cantaloupe Breeder’s Special

A small early strain of Hale’s Best. Ripens a few days earlier than “H. B.” and is somewhat smaller. Fruits average from 1½ to 2 pounds. The productive and ripening period is completed in a comparatively short time.

Globe de Oro

A so-called “white skinned” melon. Fruits round, netted, ground color a light golden. Flesh orange, cavity small, texture firm, quality excellent. Follows the “H. B.” in season. Holds up well for several days after harvesting but shows a discoloration on bruised spots. Like all of the other “white skinned” varieties, Globe de Oro has one serious fault; it splits badly. Should a rain occur during harvest, almost all the mature melons crack, rendering them worthless.

Golden Champlain

A pink-fleshed, early maturing variety. Rind rather tender; hence it does not hold up well in shipping. It deserves a place, however, as an early variety for the home market.

Hale’s Best

Hale’s Best is the leading commercial variety in Iowa. It possesses an unusual combination of desirable qualities, being a good yielder and shipper, attractive in both exterior and flesh color and of a good quality. Fruits oval to roundish, average from 2 to 2½ pounds in weight and about 5 inches in diameter. Flesh medium thick, salmon-tinted, firm in texture. Hale’s Best produces mature fruit in southern Iowa in approximately 80 days from planting.
Hale's Best, familiarly known as "H. B.", is probably the most widely grown melon in the United States. It combines to an unusual degree the essential qualities of a commercial melon. Its progenitor, Netted Gem, became more widely known under the geographic name of Rocky Ford.

A number of strains of Hale's Best, such as Cantaloupe Breeder's Special, H. B. 36 and H. B. 112, are listed in the trade.

Jumbo Hale's Best

A large strain of Hale's Best, identical with the parent variety, excepting size. The strain may find a limited demand on the local markets but is too large for a good shipper.

Hearts of Gold

Very similar to Hoodoo, of which it is claimed to be a superior strain. Early to midseason. Fruits heavily netted with pronounced ribbing. Flesh firm and of a deep salmon tint. This variety is a good shipper and was formerly an important commercial sort in the Muscatine territory. In recent years it has been largely displaced by Hale's Best.

Honey Rock

This is a recent Ohio introduction which has received favorable comment in certain sections of the upper Mississippi Valley. In size it averages somewhat larger than "H. B." and is characterized by a coarse but attractive netting. The flesh is salmon-tinted. The rind is rather thin at the blossom end, which is a serious objection in shipping. The seeds become detached and rattle when the fruit becomes ripe, a character of no consequence, but nevertheless criticized by some dealers. A good melon for the home market.

Jade Beauty

This melon is exceptionally high in quality and is fairly productive in the Muscatine area. Because of its green flesh, the markets do not look upon Jade Beauty with favor. It is an excellent variety, however, for the home garden.

Mildew Resistant No. 45

This variety, as its name indicates, is a mildew resistant sort, developed by the University of California in cooperation with the United States Department of Agriculture. This character is
of no special interest to the Middle West, where this disease is unknown. Mildew Resistant No. 45 does, however, have other characters of value to this section. The flesh is firmer and thicker than "H. B.," and its season is a few days later. In the limited test with No. 45 at Muscatine and Ames it has done well and may prove an important commercial variety for that area. "This variety has shown very satisfactory shipping qualities in extensive tests made from the Imperial Valley to eastern markets by the United States Department of Agriculture (8)."

**Pearly Pink**

Pearly Pink, though but little known in the Middle West, has done well at Ames and at Muscatine. The melons average around 2 pounds; rind medium thick, flesh salmon-tinted and ripening to the rind. Maturity midseason to late; quality good. It has promise as a melon to follow "H. B." on the market and rates well as a commercial variety in certain sections of the East.

**Superperfecto**

Fruits medium size with a remarkable thick rind and small seed cavity, quality very good, maturity midseason to late. A good variety to plant in succession with "H. B."

**Weaver Special**

This is a cross between the Honey Dew and a muskmelon and has salmon-tinted flesh. The fruits do not reach full slip on the vine but mellow up 4 or 5 days after picking. Quality is excellent. This variety ships well, its firm flesh and its tough rind preventing over ripe specimens from leaking. In season it follows "H. B." A serious fault is that it cracks badly in wet weather. There has also been complaint of lack of uniformity, some of the specimens being well netted while others are smooth skinned and resemble the Honey Ball.

**Hackensack Type**

The varieties listed under this type are distinctly oblate in outline, ribbing rather pronounced, netting moderate or scarce, fruit large.
Varieties

Green Nutmeg    Milwaukee Market
Hackensack     Montreal Market

The varieties of this group are too large to meet with favor as a shipping melon, but still have a limited place on local markets and for the home garden.

Honey Dew Type

A late smooth-skinned type of melon of excellent quality. The varieties of this group do not vine slip but ripen in storage. Varieties of the Honey Dew are too late for Iowa conditions and are subject to cracking if there is wet weather late in the season.

Varieties

Honey Ball    Honey Dew

TEMPERATURE FACTOR

The cantaloupe is distinctly a warm season crop. Temperature is the most important factor in determining the northern limits of its commercial production. Muscatine is the most northerly surplus producing area in the upper Mississippi Valley.

The question of the heat requirement for muskmelons is therefore pertinent. Temperature and growth relations are difficult to separate from other factors, hence the heat requirement is difficult to evaluate. Several methods of evaluating the temperature factor have been proposed, among them use of a "plant zero" base, which is the temperature below which development is comparatively at a standstill. Effective temperatures are computed from this plant zero up, the assumption being that the effectiveness of temperature in promoting growth in plants is directly proportional to the number of degrees of effective heat units above this plant zero base.

Ranchenstein (13) in a study of the temperature factor in the ripening of muskmelons in the Imperial Valley used 50°F as the plant zero temperature. Hawthorn (6) used a plant zero base of 50°F and found a correlation between the accumulated mean temperature and time of ripening of muskmelons.

The zero temperature for muskmelons in this study has been set at 55°F. The basis for this selection is the fact that in a normal season experienced growers plant the forepart of May,
at which time the ascending mean temperature commonly crosses the 55-degree line.

The life of the muskmelon plant may be divided into three phases; namely, the seed germination stage, the vegetative and the reproductive. Germination involves the assimilation of elaborated food stored in the seed leaves and is not given consideration in this study. This stage is usually completed by the last of May in the Muscatine region.

Early in June the plant enters upon the vegetative stage and "the vines begin to run." Cell division, which involves many chemical changes, is active during this stage. The changes, states Loomis (9), are accelerated by rising temperatures over a limited range and inhibited by excessively high temperatures. In the Muscatine area, where it is accelerated by favorable temperatures of a "quick soil," the growth phase is completed in about 30 days or during the month of June.

The reproductive or fruit bearing phase involves a change from vegetative buds to flower buds. In the Muscatine area the appearance of blossoms, which marks the beginning of the reproductive phase, occurs early in July. What is the time required between the pollination of a given flower and the harvesting of a full slip melon therefrom? In the case of the variety Hale's Best, this period embraced approximately 30 days on the "quick soils" of Muscatine Island, while from 40 to 45 days were required on the fertile Carrington loam at Ames.

EFFECTIVE TEMPERATURES

The importance of the role of temperature in chemical processes involved under both the vegetative and reproductive phases is great.

Several methods of determining the total effective temperatures for the fruit development of a given crop have been proposed. The summation method is the one most commonly used. The studies conducted by Seeley (17), however, indicate that summations based upon daily mean temperatures, ignoring the sunshine factor, are not reliable. In the formula proposed by Seeley, which is followed in this study, both the temperature and sunshine factors are evaluated in the summations. In the absence of continuous official weather records for the Muscatine station, data from the Davenport station (30 miles east and on
nearly the same parallel) are used as a basis. As previously indicated, the effective temperatures for the vegetative phase for the region in question cover June temperatures and the reproductive phase those for July.

In Fig. 10 are presented the effective temperatures for the vegetative and reproductive phases for the years 1926-36 for the Muscatine area. Data for May are not included because it covers only the germinative stage. August is not included since in an average season the crop reaches maturity about Aug. 1.

The total effective temperatures for the vegetative and reproductive phases vary somewhat from year to year; the lowest was in 1927 and the highest in 1936. With the exception of the years of excessive temperatures, i.e., 1931, 1933, 1934 and 1936, it appears that the crops were matured under effective temperatures, ranging approximately between 2,100 and 2,400°F.

The initial dates of picking for the years under consideration are as follows:

<table>
<thead>
<tr>
<th>Initial Harvesting Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>1926</td>
</tr>
<tr>
<td>1927</td>
</tr>
<tr>
<td>Year</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>1928</td>
</tr>
<tr>
<td>1929</td>
</tr>
<tr>
<td>1930</td>
</tr>
<tr>
<td>1931</td>
</tr>
<tr>
<td>1932</td>
</tr>
<tr>
<td>1933</td>
</tr>
<tr>
<td>1934</td>
</tr>
<tr>
<td>1935</td>
</tr>
<tr>
<td>1936</td>
</tr>
</tbody>
</table>

Figures 11 and 12 show the effect of these effective temperatures on the date of the beginning of harvest. The general relation shown by the June chart is inverse; that is, high temperatures mean an early harvest, and vice versa. The relation shown for July temperatures is much less than for June. Temperatures in June have the greatest effect on time of maturity of any single month; temperatures in July have the least.

Figures 11 and 12 show that while moderately high temperatures accelerate growth and maturity, extremely high temperatures, such as those of 1936, do not contribute proportionately to the early maturity of the crop.

In general the fruit did not mature markedly earlier than usual in the above mentioned years of excessive temperatures. In view of this situation it would seem evident that these excessive temperatures, i.e., above 2,400° F., did not influence the maturity of the fruit and hence are to be regarded as a surplus. On the other hand, since maturity was not retarded in years of excessive temperatures, particularly 1936, it appears that the muskmelon plant is heat tolerant to a marked degree.

The above temperature range of 2,100 to 2,400° F. seems to be in line in a general way with the findings of Hawthorn (6), after making allowance for the fact that his grand total of 2,500 heat units includes the germination stage, which is not included in the above reckoning. “When the accumulated temperature totals about 2,500° F.,” states Hawthorn, “then the first Golden Cham-

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6 A mathematical multiple correlation study shows that the multiple correlation coefficient between effective temperatures in each of the 3 months, May, June and July, and the date of maturity is 0.7266. (Perfect correlation would be denoted by 1.0.) Temperatures in these 3 months, therefore, fall short of fully determining the date of maturity. The net regression coefficients showing the separate influences of each month are as follows: May, +0.1010; June, -0.1201; July, -0.1200. June evidently has much more influence than either or both of the other 2 months.
Fig. 11. Total effective heat units — June.

Fig. 12. Total effective heat units — July.

Erwin et al.: Marketing Iowa cantaloupes
Published by Iowa State University Digital Repository, 1938
plain melons are just about ready to harvest on the full slip, irrespective of planting date, so long as it was not unreasonably late."

Under the extreme fluctuations in summer temperatures in Iowa the authors question the possibility of stating the temperature factor in the concise terms indicated above; rather it appears necessary to state them in terms of a temperature range.

Data covering several decades are essential as a basis for conclusions as to effective temperatures for a given crop; hence these studies, covering but a single decade, are regarded as suggestive but not conclusive.

**CANTALOPE PRICES**

During the recent depression, cantaloupe prices fell to very low levels. The question arose in the minds of many growers whether cantaloupe prices felt the impact of the depression more than the prices of other farm products.

A comparison of cantaloupe prices with those of two major staple crops, corn and hogs, however, reveals no special decline in the demand for cantaloupes during the depression. The annual average Iowa farm prices\(^7\) of the three products, canta-

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\(^7\) Monthly farm price data, Bureau of Agricultural Economics. U. S. D. A.
loupes, corn and hogs, for the period 1921-35, are shown in fig. 13.

The three price series in fig. 13 shows approximately the same behavior during the depression. Cantaloupe prices suffered about the same as corn and hog prices. And like these other prices, they have returned now almost to their pre-depression levels.

CANTALOupe MARKETING PROBLEMS

Several characteristics of muskmelon production and marketing in Iowa combine to make it a hazardous occupation. One year the crop may yield excellent returns, another year it may be only moderate. The Iowa grower's situation is a mixture of strong and weak features, and the relative importance of these strong and weak features changes greatly from year to year. When the strong features predominate, good returns result; when the weaknesses overbear the elements of strength, the returns are low.

PROXIMITY TO CONSUMER

A natural and inherent advantage possessed by the Iowa grower of muskmelons is his proximity to his customers. A later section of this bulletin shows in some detail that the bulk of the crop is consumed within 150 miles of the producing area.

This proximity means two things to the grower. It means first that his transportation costs are low. When muskmelons grown in Colorado or California are shipped across the continent and sold in New York, the transportation and handling charges take more than half of the consumer's dollar. In contrast, the percentage of the consumer's dollar that gets back to the Iowa grower is comparatively large.

The second result of the proximity of the Iowa grower to his consumers comes from the short time required on the road from producer to consumer. When cantaloupes are grown close to the consumer, so that only a day or two elapses between the time they are picked and the time they are eaten, they can be left on

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8 See page 153 of this bulletin.
the vine until they are "fully vine-ripened." They thus have the highest possible sugar content, which is the chief determinant of eating quality.

The distant western growers, 1,000 to 2,000 miles away, do not have this advantage of proximity. Not only do they have to pay high freight costs, but since their fruit is necessarily several days on the road they have to pick it several days before it is ripe. In trade language, they have to pick their fruit when it is "hard ripe" or before it is on the "full slip."

This situation can be shown clearly by comparing the locally grown fruit with the far western fruit in quantitative terms. It has been mentioned that the chief determinant of flavor or taste is sugar content. Tests of vine-ripened Hale's Best cantaloupes conducted by the senior author show that they have an average sugar content, based on a hydrometer reading corrected for temperature, of more than 10 percent, which is superior to the average sugar content of the best grade of far western melons.

MARKED SEASONAL PRICE DECLINE

We turn now to deal with several characteristics of Iowa muskmelon marketing that represent handicaps to the Iowa grower.

One of the most striking of these disadvantageous features is the rapid and erratic decline in muskmelon prices that takes place as the season progresses. The nature of the seasonal decline in prices, as shown in fig. 14, gives jobber muskmelon prices per crate at Chicago during July, August and September, 1936. The price behavior shown in this chart is typical of other years (11).

Not only do muskmelon prices decline markedly as the season progresses, but, in addition, they fluctuate rapidly from day to day. A particular type of fluctuation, common to the latter part of the season is shown in fig. 14. It will be observed that the price declines until at the end of August it falls as low as 25 cents per crate. Thereafter it rebounds sharply. This is because melons often come in so heavily in midseason that prices fall

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9 The Secretary of Agriculture, under the Perishable Agricultural Commodities Act, has defined the term, "vine-ripened" melon as "one which has attained full maturity on the vine as evidenced by the initiation of natural separation of stem and fruit tissue—commonly called a full slip melon."

10 See page 117.
rapidly to the 25-cent level, which is less than the transportation and handling costs of many growers. The bulk of those growers stop shipping. Prices then rise abruptly to a point high enough to start shipments moving in greater volume again.

SUPPLIES INCREASE HEAVILY

Data concerning shipments of melons are scarce; the carlot receipt figures published by the Bureau of Agricultural Economics report the carlot in detail, but that is only part of the story. Very few data concerning truck receipts of melons are available. A special study (5) of total receipts—both rail and truck—made at Indianapolis a few years ago yielded the information given in fig. 15. This chart shows the prices as well as the receipts. The short-time fluctuations in receipts (the chief cause of the short fluctuations in prices) are shown, as well as the seasonal movement as a whole.

DEMAND DECREASES AFTER MIDSEASON

Prices decline through the season not only because of increasing supplies, but also because of decreasing demand the latter part of the season. There are two reasons for this decline in demand. One is the weather. Muskmelons are regarded as
a hot weather delicacy. It is a well recognized fact among tradesmen that a cool summer is a bad melon year. With the gradual drop in maximum temperatures and the approach of autumn, the appetite for melons declines. Roadside markets experience a definite drop in melon sales during cool spells. The explanation for this decline in demand lies in the fact that the high water content or juicy character of melons places them in the same category as cold drinks, ice cream and other warm weather refreshments.

In fig. 16 is presented the normal maximum temperatures by 10-day periods for the months of June to September inclusive. It will be noted that the peak temperatures are reached about the end of the third week in July. The Iowa crop, which comes about the first of August, is therefore accompanied by gradually lowering temperatures and cool spells of recurring frequency, which in turn tends to “take off the edge” for this class of goods. The effect of cool spells upon consumer demand is in some seasons rather pronounced during the month of September.

The second reason why the demand for cantaloupes decreases in the late summer is the arrival on the market of competing fruits. A survey made the past season among the hotels and
restaurants of Iowa indicates that muskmelons are most extensively used for breakfast. In August peaches and grapes are available on our markets and compete with cantaloupes as a breakfast fruit. Peaches are not a commercial crop in Iowa, and those shipped in from a distance must be picked while still "hard ripe" in order to stand handling and hence are not always of the highest quality. Home grown grapes are of excellent quality and low in price and are probably the most serious competitor of muskmelons.

A third factor may be a satiated appetite. The public has been supplied with cantaloupes for fully 2 months previous to the advent of home grown melons and has become "fed up," and the appetite has become more or less satisfied and they are ready for a change in the fruit diet.

**PERISHABILITY OF PRODUCT**

The third distinguishing feature of muskmelon marketing is the perishability of the crop. The marketing of high-class "full slip" melons permits the elapsing of only 3 or 4 days between harvesting and consumption. Muskmelons must move fast once they are ripe. The grower, therefore, is compelled to take the market as it comes.
If the competition among the buyers is reasonably keen, he is likely to receive fair bids from them. But if the competition is not keen, he is more or less at the buyers’ mercy. This is particularly true since the grower usually is not well posted on market conditions and finds it difficult to tell whether a buyer is bidding low because the market is weak or because the grower’s bargaining position is weak.

MARKETING SEASON OF MUSCATINE AREA

Another important characteristic of muskmelon marketing is the nature, time and length of the marketing season. The movement of Iowa melons is highly concentrated. In California and other western states the harvest extends over several months, but in Iowa it is generally concentrated into 5 or 6 weeks. The average length of the marketing period for the past 10 years in the Muscatine area is only 45 days.\(^{11}\) The data for each year from 1926 to 1936 are shown in fig. 17.

This short season makes it difficult for the growers to develop satisfactory contacts with the trade. A contact is no more than well established before the season is over. Nearly 11 months elapse before it is revived.

The short season also makes it difficult to establish a given brand on the market.

It was shown earlier in this bulletin that the “Muscatine area” consists of two sections; the one is the sandy land on Muscatine Island, and the other is the area around Conesville. The soil in the Conesville district is less sandy than the Muscatine soil and does not warm up as fast in the spring nor carry the plants to maturity in as short a time as the Muscatine soil. The marketing season for the Conesville crop, therefore, is later than for the Muscatine crop. The marketing seasons shown in fig. 17 really consist of two overlapping seasons. The season for either one of the two areas is considerably shorter than the two seasons “spliced” together, which is what is shown in fig. 17. The growers in any one area ordinarily have only 3 or 4 weeks to dispose of their crop.

\(^{11}\) These figures refer to the region, not to any one grower. The harvesting period for some growers may be several days later than for others in the same neighborhood. Also, in the Conesville section of this region, in which the soil is heavier, the harvesting period is usually a week to 10 days later than on the Island.
Figure 17 shows that the time of the marketing season varies considerably from year to year. The earliest date for the beginning of the season was July 25 in 1932; the latest date was Aug. 9 in 1926. The earliest date for the end of the season was Aug. 24 in 1932; the latest date was Sept. 30 in 1927.

The marketing season also varies in length from year to year—from 29 days in 1933 to 61 days in 1930. The bulk of the crop, however, is sold in a period of 30 days, according to sales records from a number of Muscatine growers for the past 10 years.

The length of the shipping season for Wolford Brothers, one of the largest growers at Conesville, is given herewith and is typical of this situation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Date of first shipment</th>
<th>Date of last shipment</th>
<th>Total days</th>
<th>No. of crates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927</td>
<td>Sept. 4</td>
<td>Sept. 26</td>
<td>23</td>
<td>6,485</td>
</tr>
<tr>
<td>1928</td>
<td>Aug. 24</td>
<td>Sept. 21</td>
<td>29</td>
<td>12,718</td>
</tr>
<tr>
<td>1929</td>
<td>Aug. 22</td>
<td>Sept. 3</td>
<td>13</td>
<td>7,174</td>
</tr>
<tr>
<td>1930</td>
<td>Aug. 12</td>
<td>Sept. 4</td>
<td>24</td>
<td>8,805</td>
</tr>
<tr>
<td>1931</td>
<td>Aug. 17</td>
<td>Aug. 23</td>
<td>12</td>
<td>18,495</td>
</tr>
<tr>
<td>1932</td>
<td>Aug. 14</td>
<td>Sept. 2</td>
<td>20</td>
<td>16,601</td>
</tr>
<tr>
<td>1933</td>
<td>Aug. 6</td>
<td>Aug. 26</td>
<td>21</td>
<td>18,667</td>
</tr>
</tbody>
</table>
The longest shipping season was 24 days and the shortest 12. It should be noted that there is a lag of several days between the first picking and the time when there is a sufficient volume to warrant carlot shipments. The shortest shipping season was for the year 1931, and though the marketing season was only 2 weeks, the volume moved was the largest of any year of record. The marketing seasons for competing melons in nearby states is also a matter of importance. They fluctuate from year to year much as in Iowa; their fluctuations may or may not coincide with ours. When the season in a state that normally comes just ahead of ours happens to be late, and ours is early, glutted markets and low prices are likely to result and vice versa under opposite conditions.

The irregular length and timing of the harvesting season result in elements of chance over which the grower has but little control. If the crop comes on early, as it did in 1932, it may bring good prices. Again, if it is large and coincides with a small crop in competing areas and is marketed during a period of warm weather, which stimulates demand, it may sell at high prices.

TRANSPORTATION PROBLEMS

A fourth feature of Iowa muskmelon marketing is the flexible but unorganized transportation system for getting the melons to consumers. This flexibility and lack of organization has resulted from the advent of the motor truck.

"In 1928 (11) carload shipments were equivalent to about 80 percent of the melons produced for market in the United States. The proportion moved in carlots declined yearly from 1928 to 1932, when it was only slightly more than half of the production." At the present time it is probably less than half.

The rapid increase in the truck movement of fruits and vegetables is indicated by the studies of Rasmussen (14), who found that out of 44 producing areas in eight states, involving 2,961 growers and 317,617 tons for the season 1933–34, 90 percent was moved to the market by truck in 1935. It is estimated that 93 percent of the muskmelon shipments to the terminal markets in west north-central territory, embracing the cities of St. Louis,

Chicago, Minneapolis, St. Paul, Omaha and Kansas City, for the year 1934, were made by motor truck.

**MOTOR TRUCK TERRITORY SERVED**

The distributing territory served by motor trucks and the distance which muskmelons are moved by this type of transportation is difficult to measure with accuracy, but some work has been done along these lines by the Bureau of Agricultural Economics. In a survey covering New York, Boston and Atlanta,\(^3\) it was found that with fruits and vegetables in general, 89 percent of the truck receipts for 1933 were from sources mostly within a radius of 125 miles of the market served. In the more populous areas of the East, the trucking distance is evidently much less than the above named. Studies made by Rasmussen (15), covering the large eastern terminal markets which are in proximity to the producer, indicate that less than 10 percent of produce hauled by truck was carried more than 50 miles.

It also was found that when the different commodities were considered separately, the distance trucked varied widely, depending upon the perishability of the commodity and the location of the important producing districts with respect to the market being served. The maximum distance of shipment by motor truck was 1,000 miles.

The change from railroads to trucks as the chief transporting agency has taken place on Muscatine Island as well as in other sections of the country, chiefly because of the development of hard-surfaced highways. This change in transportation facilities has been especially pronounced since 1929. In 1928, for example, the Muscatine district shipped 101 (11) carloads of muskmelons. The year following, with no important change in production, there were only 35 cars, a drop of 65 percent from the previous year. In 1934 only 14 cars were shipped. The figures for 1935 are not available but are probably less than for 1934.

The greater portion, approximately 95 percent, of the Muscatine Island melons transported by truck are handled by itinerant or peddler truckers. Only a few of the growers truck their melons to market. Some have established roadside markets in northern regions and do their own hauling. Probably the ex-

planation for this situation is the fact that production and marketing are regarded as two separate operations, each requiring close attention. The grower's time is rather fully utilized in harvesting for the next day's market.

The advent of the truck as a transporting agency has also resulted in a change in the territory of distribution. Under rail shipments Iowa melons reached a number of important eastern terminal markets, such as Buffalo, Cleveland, Pittsburgh and Cincinnati. Government figures are not available as to either the number or the destination of truckloads, so during the shipping seasons of 1935 and 1936 the authors attempted to obtain information as to destination from the truckers who were loading out on Muscatine Island. Several difficulties were encountered. Some of the truckers gave information freely, but a number objected to giving information as to their destination, for fear their competitors would cover their route; others stated their destination was likely to shift enroute according to market conditions. In all cases interviewed, however, the truck license number showed the point of origin of the truck and, in a measure, indicated the territory of distribution.

The information received from most of the truckers indicated that a day's drive fixes the maximum limits of distribution. A number of buyers coming a long distance plan to make the trip to Muscatine in daylight, load in the late afternoon and return at night, reaching their destination in time for the morning market. Melons placed in a large pile, as in a truck, ripen very rapidly; hence the trip at night, when it is cool, is a decided advantage. Under these circumstances the maximum radius covered is probably less than 250 miles.

Records made by a number of growers in 1936 as to point of origin of trucks making purchases indicate that approximately 55 percent of the truckloads were distributed in Illinois, 30 percent in Iowa, and 5 percent each in Minnesota and Missouri. Illinois is the leading customer because its melon district is considerably farther south than Muscatine, and its harvesting period, therefore, comes earlier than that of Iowa. In the season of 1936, for example, the marketing of the Muscatine crop covered the month of August, whereas the last quotation for the season by the Bureau of Markets on Illinois melons was on
Aug. 14, and the peak of their harvest period was some time earlier. In addition, Illinois lies in the path of the general eastward movement of muskmelons from the surplus producing areas in the West to the heavy consuming areas of the East.

**PEDDLERS PROVIDE INADEQUATE TRANSPORTATION FACILITIES**

The bulk of the truckers are itinerant peddlers. They are accused of taking poor care of their fruit. The trucker, as a transporting agency, is under obligation to provide proper facilities for the protection of the goods in transit and to deliver them to the retailer in good condition. In this regard he is often indifferent and is open to serious criticism. In the case of a load of 100 dozen or more, or the equivalent of 1½ or 2 tons, the lower layers are subject to a heavy weight and become bruised. The retailer endeavors to cull these out in closing a deal, but despite his scrutiny a certain percentage of them, either in his hands or after reaching the consumer, develop soft spots accompanied by a bitter taste. Retailers interviewed state that the loss from decay in handling bulk muskmelons may run as high as 25 percent, the average being estimated at 15 percent.

A double-deck arrangement would prevent much of this loss.

![Fig. 18. The cantaloupes from the bottom of a load of bulk melons.](image-url)
The better class of truckers line the sides and bottom of the truck with straw or other material. Two intervening layers of the same material would do much to cushion the load and protect from bruising.

Few of the peddlers have covered trucks or tarpaulin for covering their load to protect it from the sun in transit. Many of them bring their load in at night on this account; others drive hour after hour in a boiling sun apparently indifferent to the fact that they are dealing in perishables, the life of which is seriously shortened by the high temperature. Readings taken on the top of a load by the senior author in August of 1935 showed a temperature of 165° F.

Quality in muskmelons from the consumer's point of view is primarily a matter of sweetness. As shown by Rosa (16), muskmelons in storage lose sugar due to respiration and the higher the storage temperature, the more rapid the respiration; hence this greater loss of sugar.

In general, the wholesalers and retail merchants who send their own trucks for loading are more scrupulous and better equipped than the truck peddlers to protect their goods in transit. Many of the fruit and vegetable wholesalers operate "dry ice" refrigerated trucks. Such equipment, comparable to refrigerated cars, would prove advantageous for the transporting of muskmelons, though the added expense would probably be justified only for the No. 1 grade.

A fuller realization on the part of the retailer of the impor-
tance of protecting melons in transit from heat, and a more critical attitude toward the truckers in this regard, would no doubt prove helpful.

Careless handling of melons is indirectly reflected in their consumption. The retailer meets with a higher percentage of loss on account of the manner in which the melons have been previously handled, which he in turn passes on to the consumer as an added cost, thereby retarding consumption.

**MELON GRADES AND BRANDING**

If part of the crop were graded and crated, what are the grades that should be used? Grades are not standards of ideal perfection. They are merely scales by which to measure excellence. No. 1 melons are not ideal or perfect melons either as to quality or physical condition. They are merely sound, mature melons with sufficiently high quality to give the consumer good satisfaction, yet able to be produced at a reasonable cost on a commercial scale.

In 1930, the Department of Agriculture promulgated a set of standard grades for muskmelons. They are given below.

**Standard Grades (1930)**

**U. S. No. 1** shall consist of cantaloupes of one variety. Mature, well-formed, well-netted, and free from aphis honey dew, cracks, sunburn, decay, and from damage caused by dirt, moisture, hail, disease, insects, or mechanical or other means.

Tolerance — not more than 10 percent by count and not more than one-half of this tolerance shall be allowed for any one defect and no part of this tolerance shall be allowed for decay.

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

Definition of terms as used in these grades: “Mature” means the cantaloupe has reached the stage of development which will insure a proper completion of the ripening process. “Well-netted” means having the netting characteristic of a well-developed specimen of the variety. “Damage” means any injury from the causes mentioned which is apparent in the process of proper grading and handling. “Serious damage” means any injury that seriously affects the edible or shipping quality.
Cantaloupes which are soft, immature or cracked shall be considered as seriously damaged.

In the foregoing standards the fact will be noted that no requirement as to size is specified; that is to say, a standard crate of 45’s may grade U. S. No. 1 as well as a crate of 27’s.

**GRADING “TWO FOR ONE”**

Muscatine melons are commonly hand sorted, mainly on the basis of size, into two grades: “No. 1’s” and “No. 2’s.” The percentage of the melons which go into the No. 1 grade varies somewhat according to the season and skill of the grower. Figures from some of the more successful growers indicate that around 65 percent of the crop, in a season of favorable prices, will commonly grade as No. 1’s. The No. 2’s include a good many specimens which qualify as to size but according to federal standards are off grade in other respects. It is estimated that from 12 to 15 percent of the No. 2’s would be rejected under federal grades.

A comparison of the No. 1 and No. 2 peddler grades with sizes and federal grades used for crated melons indicates that 27’s are classed as No. 1 and 45’s as No. 2 grade. The 36’s are regarded more or less as a border line for the peddler trade and may be classed in either grade, according to market conditions. As one grower expressed it, “If the market is keen the 36’s go to the truck peddler trade as No. 1’s; if the market is slow, the buyer becomes more choosy and many of them go in as No. 2’s.” In general the acceptable grades for No. 2 to the peddler trade appear to be lower than on package goods, which works to the advantage of the grower.

**GRADING AND BRANDING**

There is an increasing demand on the part of the public for the marking of grades on the container. A recent enactment by the New York state legislature, known as the Pease bill, which reads in part as follows, is typical of the legislation now under consideration in many states. “Every open or closed package of fruits and vegetables shipped into the markets of this state from another state, shall be marked in terms of the official grades on the container. A recent enactment by the New York state legislature, known as the Pease bill, which reads in part as follows, is typical of the legislation now under consideration in many states. “Every open or closed package of fruits and vegetables shipped into the markets of this state from another state, shall be marked in terms of the official

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14 In dealing with the peddler trade, the grower commonly sells two dozen No. 2’s for the price of one dozen No. 1’s, hence the trade name “two for one.”
standards and grades or classifications, as promulgated from time to time by the secretary of agriculture of the United States, commonly known as U. S. grades.”

The advantages of a brand name in many lines of merchandising are well recognized. Only a few of the Muscatine melon growers brand their packages. Branding works both ways. It is a good advertisement for a quality product and a bad one for the poorly graded article. Grading and branding, therefore, go hand in hand. The value of a brand to the growers of a given region is well exemplified by “Rocky Ford” and “Imperial Valley” melons.

Grading and branding is done by some of the larger growers, whose volume of business is extensive enough to establish their name in the trade. Where growers are small, the job can be done through a cooperative marketing association using a state registered brand. Another method is for an impartial grader—a state or federal government man—to grade, brand and date the crates of muskmelons when they are packed, which procedure does not necessitate the formation of an association. Such a brand is an evidence of quality and in the case of Muscatine muskmelons might attract wholesale fruit dealers to send their refrigerated trucks to Muscatine early in the season. A profitable outlet of this nature might become established.

For the purpose of securing data on the variety Hale’s Best as to the percentage of melons falling in the different crating sizes, the following study was made of the 1937 crop. One thousand melons were graded for size, with the following results:

<table>
<thead>
<tr>
<th>Percentage of Melons of Each Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 percent sized 27’s</td>
</tr>
<tr>
<td>10 percent sized 36’s</td>
</tr>
<tr>
<td>18 percent sized 45’s</td>
</tr>
<tr>
<td>10 percent oversize of all packs</td>
</tr>
<tr>
<td>7 percent culls</td>
</tr>
</tbody>
</table>

The general run of these melons, as will be noted from the fact that 55 percent of them graded 27’s, was large.

**Loss from grading.** One of the leading growers who crates his entire crop estimates the shrink from culls will average 16 percent with the variety Hale’s Best.
CONTAINERS

If part of the crop were graded and packed, what type of container is best suited to Iowa conditions? Three types of packages are used; namely, 1-bushel baskets, crates and flats. Baskets have both their good and bad points as containers for melons. The tops are bulged in order to keep the fruits under sufficient tension to prevent movement and bruising. This means that the top layer of melons projects above the rim of the basket; consequently, the weight of the basket is carried by the melons rather than on the rim of the package, as it should be. A new type of cover, with a round sloping top, has been introduced, which appears to have some advantages over a flat top basket.

A bushel basket commonly contains a maximum of 18 Hale's Best and costs approximately 12½ cents, which adds upwards of 1 cent to the cost of the melon, less the resale value. For small lot shipments, where it is not necessary to stack in tiers, the basket container serves very well. This package also has an advantage in that the empties have a resale value and can be utilized for a variety of purposes, whereas a used melon crate has no value.

In the Muscatine area baskets are used by only a few growers serving a select trade. In other Mid West muskmelon areas they are more widely used. In a study of the Indianapolis market, Gaylord (5) reports that during heavy production bushel baskets are by far the most widely used containers.

Crates run in three sizes; namely, standard, jumbo and pony. On the market the crates are designated according to the number of melons contained therein as standard 9's, 27's, 36's and 45's, etc. and are packed in three tiers.

Flats vary in dimensions and count. In general their content is one-third that of a crate. Flats have certain advantages. In the instance of the small grower who does not have a large stock to grade over at any one time, flats are much less exacting to pack, and since the melons are only one layer deep they are easier to inspect. Many of the restaurant trade orders can be filled without breaking a package, which protects the fruit from rehandling. The disadvantage is that the added cost per melon is greater than with a crate.

The exact dimensions of containers used in different regions
vary widely. A number of the Muscatine growers expressed a preference for flats of the following dimensions:

- **Standard 13\times 4\frac{1}{2}\times 2\frac{1}{2}**
  - Contents — 11 to 15 melons
- **Jumbo 14\frac{1}{2}\times 4\frac{3}{4}\times 2\frac{1}{2}**
  - Contents — 8 to 12 melons

Cost of container will average around $1\frac{1}{2}$ cents per melon.

**BULK MARKETING VS. PACKING AND CRATING**

The Iowa muskmelons are of excellent quality when they are picked at the full slip stage. But most peddlers are preoccupied with price, largely ignoring quality. They offer but little reward for strict grading of the fruit and take poor care of it while it is on its way to the consumer. The fruit arrives poorly graded and with many bruised specimens; hence the grower’s advantage of proximity to market is partly lost.

Is this situation unavoidable? Could some system be worked out by which better care would be taken of the fruit, or would it cost more than it would add to returns? Should Muscatine growers grade their melons and market only the first grade fruit, leaving the No. 2 grade at home instead of selling it in bulk? That is the practice followed by producers in California and Colorado.

A comparison with these western states may not be valid, for our situation differs from theirs. The long distance shipper can afford to pay the transportation costs and handling charges only on the best grade of fruit. For him the sale of second grade melons is likely to result in a net loss, particularly in periods of low prices. The transportation, commission and handling costs for western shippers (California, Colorado, Arizona, etc.) take from two-thirds to three-quarters of the consumer’s dollar (12). Accordingly, second grade fruit, which might be worth 75 percent as much as No. 1 grade, would bring in only perhaps 25 percent as much to the grower, and in some cases would bring in nothing at all. But the local grower, whose transportation costs are low, may realize a fair return on his seconds; it will be a lower return than on No. 1 grade but may still yield a fair return above the cost of marketing.

The shipping of only high grade produce is not a panacea for
all marketing ills. Such a theory, notes Rasmussen (14), "makes the violent assumption that all family incomes are equal and that therefore the economic demands of all families are equal. It is much like saying that if only Lincoln motor cars were placed on the market, the average motor car price would be higher. This is obviously true, but it would also mean that only a few motor cars would be sold."

In terms of muskmelons, fewer melons would be sold. The ability to buy is based on income. Surveys made by the Department of Commerce indicate that 34 percent of the families residing in the North have incomes of less than $1,000 per year. Hopper (7) concludes that families in this lower income group would "practically cease to consume fruits and vegetables, if only first-class produce came to market." That is, if all cantaloupes were first grade (instead of perhaps only half, as at present), they could all be sold only at lower prices than are paid for No. 1 fruit at present.

Grading and crating alone will not automatically solve all the grower’s marketing problems. The grower who sells in bulk gets cash and, even though the return is not large, it is certain. Consignments reaching a draggy market may bring back a report "arrived in bad order," with a remittance scarcely sufficient to cover the cost of the crates or even a bill for a portion of the transportation costs. One of the leading growers submits figures which are pertinent in this regard. On Aug. 18, 1931, a car of crated melons shipped to Pittsburgh netted 13.6 cents per crate; Aug. 19, 3.4 cents per crate; on Aug. 20, two cars were consigned to the same market on which the returns lacked 4 cents per crate of being sufficient to pay handling and transportation charges, and on Aug. 22 a car to this market netted a similar deficit of 8.2 cents per crate. On the other hand, a car billed to Waterloo, Iowa, on Aug. 17, 2 days before the first car to Pittsburgh, netted 70 cents per crate. Such experiences are not confined to any one year nor to the period of the depression, though the latter was a contributing factor. Unhappy experiences with unscrupulous dealers on the terminal markets have done much to discourage grading and packing and the organization of a cooperative marketing. The passage of the Perishable Agricultural Commodities Act (3) in 1930, requiring
all dealers in perishable products in interstate commerce to be licensed by the federal government and prohibiting certain fraudulent practices, has paved the way for considerable improvement in the trade relations between growers and dealers at distant points.

Because of the necessity of rehandling, the terminal markets handle only crated goods; consequently, the grower who is not provided either individually or through a cooperative association with necessary packing sheds and grading equipment is excluded from these markets, regardless of how attractive his prices may be. There is also a limit to the distance which bulk melons can be trucked and delivered in prime condition. In normal seasons probably the best way for producers to market their fruit is to combine the bulk and crating systems. It is only when prices are reasonably high and the product is well graded and high in quality that marketing crated muskmelons is likely to be successful. In the forepart of the season these conditions usually exist; so long as they prevail, strict grading and crating is likely to prove profitable. Later in the season, when glutted periods occur on the terminal markets, a shift to the bulk marketing method may bring the grower a higher net return. Neither method is exclusively the best. What is needed is a combination of the two.

THE PEDDLER BUYER

The present marketing setup for all truck crops for Iowa has been described, and no doubt justly so, as "highly unorganized." This condition has been largely attributed to the peddler buyer who entered the marketing picture after the development of good roads and the growth of trucking. "Where he comes from and where he goes, nobody sees, nobody knows." The market where he sells his load and the price he receives is difficult to ascertain. In fact, very little is known about this comparatively new market outlet which is so generally condemned but to which the greater portion of the commercial muskmelon crop is sold.

Criticism of the peddler is freely expressed by most growers. Undoubtedly his methods are subject to condemnation. A low price, rather than quality, is the first consideration of the peddler buyer. His methods of beating down the price are many, the most common one being to complain bitterly about high prices and defer buying until he has spread the word, often with little
basis in fact, that other growers are cutting the price, until he is finally able to buy at a low figure.

The peddler is not entirely to blame, however. The market system itself is the real cause of dissatisfaction. In operation it is simple; too simple. The farmer, having picked the day’s ripened melons in the early forenoon, awaits the arrival of peddlers to bid. The melons are either left on the wagon as harvested or piled in a convenient shed. Frequently the peddler’s load will consist of purchases from several different growers, each of whom may have received widely divergent prices with or without a corresponding diversity of grades and quality. There is no single market in which buyers and sellers meet collectively for the purchase and sale of their muskmelons. There is little opportunity for growers to know what their melons are actually worth. Each farmer sells independently, knowing little about the prices existing in the wholesale or retail markets, or about the prices being received by other growers, both in his own area and in other areas. Government market reports are available to any grower through his county agent upon application, but very few of the growers receive them. The reports deal with prices in terms of grades and crates, and it is somewhat difficult for growers selling ungraded fruit in bulk to make accurate interpretations of them. Consequently, the grower’s market information is gained largely through the peddler. The peddler is better informed both as to the demand and the size of the supply and naturally takes advantage of his more complete knowledge.

The perishability of the crop is not increased by the marketing system itself, but the combination of perishability which necessitates rapid disposition of the crop with the lack of price information possessed by growers, gives buyers an effective weapon in beating the price down in this type of market. The weapon is the more effective because the growers do not stick together.

Leading growers at one time clubbed together on carlot shipments whenever the local market became overstocked. Often these shipments netted very little in direct returns, but it was believed that they paid well indirectly by relieving pressure at the local market. The small grower, however, is handicapped.
With only a few dozen melons to sell daily, he is passed up by the big trucks, and finally cuts the price to the small peddler who goes to various places to get a load.

**Speed in marketing.** The truck peddler can load in late afternoon and arrive in Chicago for the opening market the next morning. The product arrives on the market at a favorable time and avoids terminal delays.

**Reduces handling.** The melons are loaded at the farm and unloaded at the retailer's, which eliminates rehandling at both ends of the line. The sale is for cash at the farm. The deal is consummated and the chances of any "comeback" with deductions for goods arriving in bad order, or sale at a loss on account of a glutted market, are eliminated.

Arguments against the truck peddler are: He is not financially responsible, maintains no headquarters, sells in bulk, does not handle a graded article and does not protect properly his goods in transit. He buys wholly on a price basis and his general influence on the market is demoralizing. Having only a few dollars to invest, and realizing that with a limited sum he can secure more dozens of poor melons than good ones, he purchases job lots at a cut price. The word is then passed out that so-and-so is selling at this figure, with the resulting tendency to lower a price level on good products as well as poor.

One of the serious criticisms of the truck peddlers made by the growers is their lack of dependability. One day they appear in numbers — too many perhaps for the available supply, and the next day there are scarcely any. This situation results in an uneven flow to the market. The accumulation of such a perishable article, accentuated by prevailing high temperatures, tends to make the grower nervous of his market, and when buyers do appear, the grower's attitude is liable to be that of "not let him get away without a load," which tends to establish a buyer's market around the weaker growers. This situation is avoided by many of the larger growers by establishing a contact with a reliable peddler for the season, with whom he has an understanding as to when he will return for the next load.

**EFFECT OF PEDDLERS ON PRICE**

The peddler, then, is accused of two things: 1. Depressing the price of cantaloupe by sharp trading practices and 2. having a bad effect on the quality of the fruit.
The validity of the first accusation can be tested by comparing the local farm prices for cantaloupes in the Muscatine district with the prices at the nearby terminal markets to which cantaloupes were shipped previous to the advent of the peddler.

Accurate information as to prices received by the growers for a period of years proved difficult to secure. The majority of the growers do not keep books, and the record books furnished by the authors did not accomplish much of a reformation along this line.

A number of the more successful growers, however, keep excellent records, some of them dating back for upwards of half a century. They are shown in fig. 20, compared with Chicago prices minus handling and transportation costs to Chicago. The returns to growers shown in the graph are not average returns for all the growers of the Island, but rather represent returns received by the most successful group. They are, therefore, higher than the average for all the growers. The Chicago quotations are for salmon-fleshed melons from Indiana and Illinois, to which group the Hale's Best grown at Muscatine belongs. These Chicago prices are not the face quotations, but the net price at Muscatine after deducting cost of transportation, crates and commission charges.

Figure 20 shows that in every year, and to an increasing extent in recent years, the peddler has paid more than the producer would have received, net, at the Chicago market. Thus, although the policy of the peddler is to purchase his load of melons as cheaply as possible, he has paid higher prices than the grower could have realized at the terminal market. This does not mean that the peddler is paying as much as he can. It merely means that he pays higher prices than growers can get by other means.

Cantaloupes from the Imperial Valley in California customarily sold in Iowa in July of 1937 for 12 cents apiece for the 36 size (melons that run 36 to the crate). The retailer takes about 3 cents. Freight, refrigeration and pre-cooling takes 3.5 cents. Commission, brokerage charges amount to 1.5 cents. This leaves 4 cents per cantaloupe for the grower. Out of this he pays crating cost, realizing net, therefore, something in the neighborhood of 3.5 cents per melon.
Fig. 20. Comparison of yearly average prices of Iowa muskmelons paid by peddler buyers and terminal markets. 1927–35.

We may compare this with the prices that Muscatine growers realize net from their fruit. In the early part of the season a representative price paid by truckers to Muscatine growers is 50 cents per dozen for No. 1 melons, and 25 cents per dozen for No. 2 (small) melons, under the prevailing “two for one” practice. About a third of the melons may run No. 2; the weighted average price for melons at Muscatine is, therefore, a little more than 40 cents per dozen, or about 3.5 cents per melon, which is approximately the same price that the California grower receives net. In other words, the price differential for western melons, for the month of August, is more apparent than real.

**EFFECT ON QUALITY**

The second accusation against the peddler — that he has a bad effect on the quality — is more valid than the accusation that he depresses the price. One of the leading fruit and vegetable commission firms writes: “We are using no Iowa grown stock (muskmelons). The Iowa crop moves at a time when the market is glutted with truckloads in bulk from Muscatine and other
points of production which are sold on the basis of price rather than quality, making it impossible for us to market Iowa melons. By and large the "scoop shovel" method of marketing muskmelons in bulk in the hands of the truck peddler has ruined the market, and the returns the growers receive reflect the carelessness of their method of grading and handling. It is our opinion that, unless cantaloupes are produced locally and hauled to market over a very short distance, they should be crated, packed as to size and graded. There will never be any market for Iowa cantaloupe production until by legislation or common consent no deliveries are made unless graded and sized."

THE LOCAL WHOLESALE MARKET

The wholesale fruit and vegetable trade absorbs a considerable portion of Iowa’s muskmelon crop. These wholesale dealers purchase directly from the farmers and in turn supply town and city retail grocery stores. There are approximately 80 such companies in Iowa and possibly as many more in Illinois and Missouri within reasonable trucking distance from Muscatine.

The exact importance of this market has not been determined, but at present there are several companies, some 250 miles away, whose trucks come directly to the Island for vegetables. In general these trucks are better equipped than the truck peddler to handle melons. Recently a questionnaire was mailed to all Iowa fruit and vegetable wholesalers in an attempt to determine the amount of Iowa-grown muskmelons, watermelons and sweet potatoes the Iowa market is purchasing and to estimate the possibilities of its development. The replies were not adequate for either purpose, however. Those that were received seem to indicate that it is not likely that wholesalers under present severe peddler competition can find it profitable to greatly increase their demand for Iowa melons.

ISOLATED MARKETS

Isolated markets, because of the advent of good roads, no longer exist. Small towns which would not handle carlot deliveries now receive prompt service by truck. The peddler system, with all its faults, has a high degree of flexibility, and provides small-market coverage that the railroad distribution system lacked.
ROADSIDE MARKETS

Roadside markets have proved an important outlet for cantaloupes. Some of the Muscatine growers who are situated on the trunk highway maintain their own stands. A few have established roadside stands in northern regions. Such markets in northern deficiency-producing areas would seem to have possibilities which have not been fully utilized to date.

Prices received by growers retailing at roadside markets show a wide variation, ranging from that received at the retail grocer to that offered by the wholesaler. The development of a system of paved highways has served to bring the consumer in more direct contact with the producer in the disposal of seasonal products, and the prices and grade should be such as to tempt the buyer on the one hand and add to the profits of the consumer on the other.

A MARKET FOR FROZEN MUSKMELONS?

The freezing of fruits and vegetables has served to extend the period of consumption and increase the demand for these products. So far muskmelons have not gained a place in the list of frozen products. Preliminary tests of a number of varieties were run by the authors. Melons were packed in 1-quart paper ice creams cartons in quarters, diced and in small balls. In the case of salmon-tinted varieties, such as Hale’s Best, the color was somewhat paler than in the fresh product at the end of 3 months, but the texture and flavor were very good. In some varieties there was evidence of loss of the delicate musk flavor in a few months, leaving a cucumber-like after-taste. Re-handling after being thawed is a disadvantage, and for this reason the dice or balls were preferred. The thick fleshed varieties, such as Perfecto, handled to good advantage. The addition of muskmelons to the list of frozen products seems promising and might serve to extend the demand somewhat and extend the period of consumption of a highly perishable product.

However, in order to interest any of the companies who make a business of handling frozen fruits in the proposition of establishing a local plant, it would be necessary to insure a sufficient volume of a satisfactory variety for this particular purpose, to justify the outlay.
COOPERATIVE MARKETING

Some of the advantages possessed by muskmelon growers in Iowa could be capitalized on and some of the disadvantages overcome through cooperative action.

At present, many of the advantages of the inherently high quality of the Iowa muskmelons (if they are picked on the full slip) are lost or offset by a lack of grading, sizing, branding and proper care enroute to market. A cooperative could establish a brand and apply it only to fruit that was high grade in all respects. By advertising, backed up by a product of this sort, it could interest high grade dealers in purchasing its product. With proper care on the way to market a consumer preference for their brand that would ensure the highest prices available in the market could be established.

The benefits of such cooperative action are shown in the experience of the muskmelon growers in southeastern Michigan. About half of the crop there is sold through a cooperative marketing association. Over an 8-year period the cooperative shipper netted an average of 17 cents per crate more than the non-member grower (4). In many other sections cooperative associations have improved the grades of the product and put a brand on it that is recognized in the trade as one of excellence.

The difficulty of organizing and maintaining such an association on Muscatine Island, however, is great. An association organized in 1905 did business for several years but shortly got into difficulties and ceased operations in 1912. An attempt to form another association in 1932 failed.

Several reasons have been advanced why cooperative marketing has not been successful on Muscatine Island. More than half the farmers are tenants. The Island lacks a focus of community organization. That aptitude for working together, which is a prime prerequisite of successful cooperation, does not appear to be a dominant factor (19).

In addition to these reasons, other more definite economic characteristics of Muscatine muskmelon production and marketing render cooperation difficult. As previously stated, the returns from muskmelon growing are very uncertain. Accordingly, it is not safe for the grower to depend upon it as his main crop.
Many of the growers regard it as a sideline, something that may bring in some cash for fall operations. The acreage per grower, therefore, is small, the average being between 5 and 10 acres per grower. The total income from the crop, then, is not large and fluctuates. The urge toward cooperation is consequently weak.

A clear recognition of these difficulties, however, may help in surmounting them. The chief weaknesses are the small size of the total income from cantaloupes, the fluctuation in this income from year to year and the long period each year between shipping seasons when an association must lie dormant. These weaknesses could be partially overcome if an association were set up to market not only cantaloupes but sweet potatoes and watermelons as well. The marketing periods for these three crops together spread over a considerable period of time. The total income from the three crops is relatively large and more stable than from any one of them alone. If the association, in addition to marketing these three products, purchased containers, fertilizer and insecticides, its activities would cover still more of the year and it would have that much better chance of success. The job can be done. It has been done in other states, where conditions are similar to those at Muscatine.
LITERATURE CITED


