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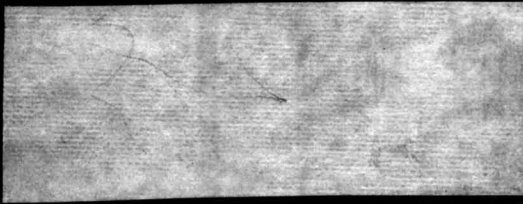
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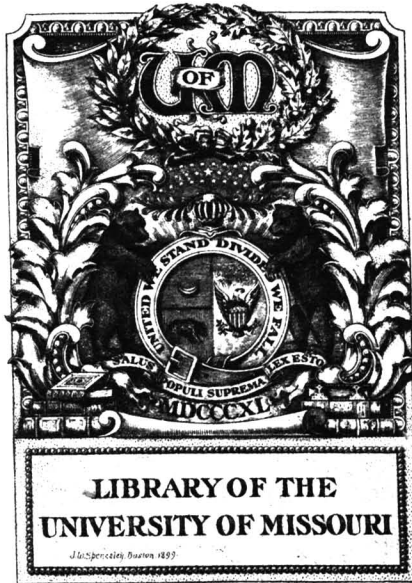
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A STUDY IN THE MARKETING
OF PERISHABLE FRUIT

by

Ashleigh Pannel Boles, A. B.

SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in the

GRADUATE SCHOOL

of the

Approved
J. C. Whitten

UNIVERSITY OF MISSOURI

1915

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May 15, 1915.

Professor S. D. Gromer,
208 Agricultural Bldg.

My dear Professor Gromer:

It is customary for the Graduate Committee to refer dissertations, submitted by candidates for the degree of Master of Arts, to some member of the Group who is not connected with the Department in which the candidate's work has been done. I am sending you herewith a dissertation which has been submitted by A. P. Boles. I shall be greatly obliged if you will kindly examine the same at your earliest convenience and report to us for the Graduate Committee whether in your opinion the dissertation meets the general standard which has been established in this University for the Master's dissertation.

Very truly yours,



Chairman, Graduate Committee.

A STUDY IN MARKETING
THE
OZARK STRAWBERRY CROP.

INTRODUCTION.

During the past decade (1904-1914) the strawberry growing industry in the Ozark region of South Missouri and North Arkansas has developed to such large proportions that it is now one of the largest cash producing crops of that section.

The writer has been attracted to a study of the factors involved in marketing the strawberry crop of the Ozark region because his present work brings him into close personal touch with the Ozark farmers as they are growing strawberries; with the management of the local strawberry shipping associations as they are loading cars; with the transportation officials as they are moving the crop to market; with the middle men as they are distributing the crop to the jobbers and retailers; and finally with the retailers as they are delivering the strawberries to the consumer. Special opportunity for this study was made possible by reason of his official position as Horticultural

Agent for the St. Louis and San Francisco Railroad System, which enabled him to secure information which otherwise would have been withheld. He was also able to make repeated trips between the strawberry producing section and the markets at very little expense because of the courtesy of free transportation which large trunk line railroads in the United States exchange with each other.

This investigation shows that the strawberry industry of the Ozark region had its inception in the homegardens of the early settlers. These sturdy pioneers discovered that the soil, the climate and the topography of this region produced strawberries of the finest quality. Local markets were developed by these early farmers in the towns which had sprung up around the trading posts. With the advent of the railroads, small shipments of strawberries were made to neighboring towns. Very few of the pioneer strawberry growers kept an accurate record of the yields per acre or of their net profits. Wild rumors of enormous profits are often related, but the writer has been unable to get any reliable data as to yields and profits until the commercialization of the refrigerator car put the strawberry industry on a permanent basis. The refrigerator car with frequent re-icing will preserve the original flavor and appearance of strawberries during a long haul to market, covering from four to six days. This enables the growers to supply all the large city markets within a radius of a thousand to fifteen hundred miles. Fortunately, the

Ozark region is so located geographically, that its strawberries are ready for shipment just after the supply from the strawberry growing regions of South Texas and Louisiana is exhausted and just before the local, home grown berries begin to compete with the shipped product in the Northern and Eastern markets.

In order to load in car lots daily and to relieve the small farmer of the responsibility of finding a market for his individual output, local strawberry shipping associations were organized and managers were selected to handle the berries of all its members. Under these favorable conditions, the production of strawberries in the Ozark region of Missouri and Arkansas increased from a few cars sent out in small express shipments, to a production of more than five hundred car loads per year. For several years the demand far exceeded the supply and it was possible for the local associations to distribute their entire output profitably without cooperating with each other. But in the period between 1900 and 1905 the lack of cooperation of the local secretaries in distributing the crop, resulted in an over supply of some markets and an under supply of others. Realizing from this the need of cooperative distribution, thirty-two local strawberry associations in the Ozark region combined to ship their entire crop through the Ozark Fruit Growers' Association. A discussion of the Ozark Fruit Growers' Association will follow in the chapter on "The Affiliated Central Distributing Associations."

The average price of strawberries had fallen to less

than one dollar per crate for the seasons of 1903 and 1904, but in 1905, owing to the better distribution under the management of the Ozark Fruit Growers' Association the average price per crate increased to \$1.04. The average price per crate for each season following 1905 up to 1914 has never been lower than \$1.18 per crate (1912), nor higher than \$2.28 per crate (1907). The total cash value of the Ozark strawberry crop has been more than \$500,000 a year for each of the last ten years, or a total of \$5,000,000 for the decade.

The strawberry industry has been a large factor in the development of the Ozark region. Its success is dependent upon the proper solution of a great variety of problems which cannot be solved by either the growers, the shipping association, the commission merchants, or the consumers alone, as none of these see the product except in certain stages. For that reason it has been thought desirable to study the industry in every phase from the production of the crop by the grower to its final distribution on the market.

OBJECTS OF THE INVESTIGATION.

The purpose of this investigation has been to secure all possible information and data in regard to the various steps in the development of the Ozark strawberry industry and

to study its many phases with special relation to the problems of marketing. Some of the more important phases are as follows:

First. The selection of varieties which fulfill alike the requirements of the grower, the market-man, and the consumer.

Second. The time and manner of picking most conducive to proper refrigeration and marketing.

Third. The methods of grading and packing most profitable to the grower and attractive to the consumer.

Fourth. The kind of package which will best meet the requirements of strength, ventilation, ease of handling, and attractiveness to the consumer.

Fifth. The methods of inspection acceptable to the grower and at the same time efficient in maintaining the required standards.

Sixth. The methods of selling most profitable to the grower and at the same time acceptable to the market-man.

Seventh. Methods necessary for proper distribution of the Ozark strawberry crop.

Transportation problems have been considered only on the basis of car lot shipments.

The strawberry crop in its course from the producer to the consumer passes through numerous agencies. The viewpoint of each agent is based on information gathered with reference to this particular phase of the subject only. For illustration, the grower may favor a variety which produces

the largest yield per acre, or which presents the best appearance in the field. Such a variety, however, may be too soft for distant shipment or may not be large enough to suit average market demands, and therefore, may not please the buyer. Furthermore, the grower and the market-man may have antagonistic ideals as to the best packages for commercial use. The grower may favor a package which is compact and well built, whereas the market-man may favor one which is light and well ventilated. To harmonize the ideas of the grower, the package manufacturer, transportation official, the buyer and broker and the market-man, it has been necessary to make a thorough study of every factor influencing the marketing of the strawberry crop, and to keep in mind the difficulties peculiar to each phase of the industry.

SOURCES OF INFORMATION.

A large number of men engaged in various phases of the industry have been consulted. Many opinions and figures were given the writer which he was unable to use directly, yet many of these unrecorded opinions and figures were of value in making up the final text of this paper.

A personal study of the strawberry crop during the growing and marketing season has been made at twenty-two different shipping points in the Ozarks. Market conditions have been studied during the same period in St. Louis, Oklahoma City,

Kansas City, Des Moines, Omaha, Minneapolis, St. Paul, Chicago, and New York City. In addition over five hundred letters were written to growers, buyers, package manufacturers and market-men in regard to the different problems studied. The writer estimates that more than seven hundred persons and firms in all have been consulted either in person or by mail. Grateful acknowledgment is made to the following individuals who have made this investigation possible by cheerfully furnishing all the information at their command.

Growers and Shippers.

| | | |
|-------------------|-----------------|----------|
| George Appleby, | Fayetteville | Arkansas |
| Dr. E. L. Beal, | Republic | Missouri |
| S. D. Canady, | Marionville | " |
| Ed. O'Dwyer, | Monett | " |
| J. G. Eberly, | Sulphur Springs | Arkansas |
| P. F. Furry, | Van Buren | " |
| Sidney Graham, | Springdale | " |
| Charles Stearns, | Fayetteville | " |
| Ralph George, | Peirce City | Missouri |
| Fred Kantz, | Fayetteville | Arkansas |
| S. B. Keagy, | Diamond | Missouri |
| John Ledyl, | Peirce City | " |
| C. McNallie, | Sarcoxié | " |
| R. P. McReynolds, | Peirce City | " |
| E. N. Plank, | Decatur | Arkansas |

| | | |
|-----------------|--------------|----------|
| Burtis Rudolph, | Fayetteville | Arkansas |
| T. F. Starcher, | Aroma | Missouri |
| F. H. Smeltzer, | Van Buren | Arkansas |
| Joe Webb, | Rudy | " |
| Will Irwin, | Peirce City | Missouri |
| Ira Neff, | Marionville | " |
| J. A. Bauer, | Judsonia | Arkansas |

Managers of Strawberry Shipping and Selling Associations.

Chas. Appleby, Mgr., Farmington Fruit Growers' Association,
Fayetteville, Arkansas.

J. M. Barrett, Mgr., Van Buren Fruit Growers' Association,
Van Buren, Arkansas.

W. D. Brendlinger, Mgr., Peirce City Fruit Growers' Association,
Peirce City, Missouri.

Wilson Cardwell, Mgr., Springdale Berry Growers' Union,
Springdale, Arkansas.

W. D. Cowherd, Mgr., Neosho Branch, Ozark Fruit Growers' Association,
Butterfield, Missouri.

J. B. Graves, Ex. Mgr., Independent Association,
Neosho, Missouri.

W. G. Wygant, Mgr., Monett Fruit Growers' Association,
Monett, Missouri.

W. B. Spillman, Mgr., Monett Horticultural Association,
Monett, Missouri.

J. M. Phillips, Mgr., Springdale Fruit Growers' Association,
Springdale, Arkansas.

J. Ed. Roark, Mgr., Anderson Fruit Growers' Association,
Anderson, Missouri.

Tom Taylor, Secy., Fayetteville Fruit Growers' Association,
Fayetteville, Arkansas.

Wm. Smerdon, Mgr., Southwest Missouri Fruit Growers' Association,
Monett, Missouri.

J. W. Stroud, Secy., Ozark Fruit Growers' Association,
Rogers, Arkansas.

P. A. Rogers, Mgr., Ozark Fruit Growers' Association,
Gravette, Arkansas.

Traveling Buyers and Brokers.

N. M. Hoover, Broker, Peirce City, Missouri.

John Maxwell, Buyer, Schmidt, Gaertner Vallee Co., et al.,
Milwaukee, Wisconsin.

Chas. Mays, Broker, Johnson, Arkansas.

H. A. Oakley, Buyer, Genocchio Jones Co., et al.,
Kansas City, Missouri.

W. R. Russell, Broker, Monett, Missouri.

John Seamster, Buyer, Gamble Robinson Co., et al.,
Minneapolis, Minnesota.

Chas. Skelton, Buyer, W. D. Anderson & Co.,
Topeka, Kansas.

Wm. Allred, Buyer, Largo Marcino Grupe Fruit Co.,
Davenport, Iowa.

Commission Market-Men.

| | | |
|----------------------|--------------------------------|--------------------|
| F. W. Brockman, | F. W. Brockman Commission Co., | St. Louis, Mo. |
| Mr. Davidson, | Davidson Bros., | Des Moines, Ia. |
| Mr. Dore, | Dore Redpath Co., | St. Paul, Minn. |
| Louis Federer, Mgr., | F. W. Brockman Commission Co., | St. Louis, Mo. |
| R. Harry Jones, | Genocchio Jones Co., | Kansas City, Mo. |
| P. M. Kiely, | P. M. Kiely Commission Co., | St. Louis, Mo. |
| Mr. Longfellow, | Longfellow Bros., | Minneapolis, Minn. |
| Mr. Stacy, | Stacy Bros., | Minneapolis, |
| C. C. Taft, | C. C. Taft & Co., | Des Moines, Ia. |

Thanks are also due to the many others who have given valuable information either in personal interviews or by mail.

A tabulated summary of data gathered from twenty-nine shipping associations is given in the following table.

TABLE NO.1

Showing Average Yield and Returns per Acre for Twenty-nine Strawberry Shipping Associations in the Ozarks, covering 15,631 Acres.

| Name of Association | Year | Total Acreage | Total Number Crates | Average Number Crates Per Acre | Average Price Per Crate | Average Gross Returns Per Acre | Cost of Harvesting Per Acre | Returns to Grower Less Harvesting Cost Per Acre |
|-------------------------------------|------|---------------|---------------------|--------------------------------|-------------------------|--------------------------------|-----------------------------|-------------------------------------------------|
| Aroma F.G.A. | 1912 | 300 | 13351 | 44.52 | \$1.14 | \$50.57 | \$24.48 | \$26.09 |
| | 1911 | 350 | 10838 | 30.96 | 2.06 | 63.78 | 17.02 | 46.76 |
| Belfast F. G. A. | 1913 | 320 | 12391 | 38.72 | 1.74 | 67.37 | 21.29 | 46.08 |
| | 1912 | 200 | 16854 | 84.27 | 1.11 | 93.54 | 46.35 | 47.19 |
| | 1911 | 141 | 2893 | 20.52 | 2.13 | 43.71 | 11.28 | 32.43 |
| Butterfield Berry Association | 1913 | 400 | 12803 | 32.01 | 1.95 | 62.42 | 22.72 | 39.70 |
| | 1912 | 400 | 14956 | 37.39 | 1.19 | 44.49 | 20.56 | 23.93 |
| | 1911 | 250 | 6179 | 24.71 | 2.06 | 50.90 | 13.59 | 37.31 |
| Logan F.G.A. | 1913 | 400 | 12102 | 30.25 | 2.02 | 61.10 | 22.08 | 39.02 |
| | 1912 | 350 | 28376 | 81.07 | 1.43 | 115.93 | 44.58 | 71.35 |
| | 1911 | 350 | 6680 | 19.08 | 1.38 | 35.87 | 10.49 | 35.38 |
| Marionville F. G. A. | 1913 | 75 | 4463 | 59.51 | 1.87 | 111.28 | 43.44 | 67.84 |
| | 1912 | 200 | 12360 | 61.80 | 1.37 | 84.67 | 33.99 | 50.68 |
| | 1911 | 250 | 4478 | 17.91 | 1.31 | 32.42 | 9.79 | 22.63 |
| Monett F.G.A. | 1913 | 300 | 11885 | 39.62 | 1.79 | 70.92 | 28.14 | 42.78 |
| | 1912 | 350 | 17924 | 51.21 | 1.19 | 60.94 | 36.35 | 24.59 |
| | 1911 | 300 | 6852 | 22.84 | 2.13 | 48.65 | 12.56 | 36.09 |
| Peirce City F. G. A. | 1913 | 525 | 12324 | 23.48 | 2.01 | 47.19 | 17.67 | 29.52 |
| | 1912 | 500 | 26764 | 53.53 | 1.38 | 73.87 | 38.00 | 35.87 |
| | 1911 | 500 | 10670 | 21.34 | 2.28 | 48.65 | 11.73 | 36.92 |
| Pomona F. G. A. | 1913 | 200 | 3020 | 15.10 | .88 | 13.29 | 11.02 | 12.27 |
| | 1912 | 150 | 4586 | 30.57 | .74 | 22.62 | 16.81 | 5.81 |
| | 1911 | 90 | 2664 | 29.60 | 1.94 | 57.42 | 16.28 | 41.14 |

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|---------------------------|------|---------------|---------------------|--------------------------------|-------------------------|--------------------------------|-----------------------------|-------------------------------------------------|
| Purdy Hort'l. Association | 1913 | 250 | 8122 | 32.49 | \$1.89 | \$61.41 | \$23.71 | \$38.70 |
| | 1911 | 300 | 5690 | 75.87 | 1.97 | 149.46 | 41.72 | 107.74 |
| Neosho Southwest F. G. A. | 1913 | 600 | 21408 | 35.68 | 1.75 | 62.44 | 19.62 | 42.82 |
| | 1912 | 1200 | 57721 | 48.10 | 1.15 | 55.32 | 26.45 | 28.87 |
| | 1911 | 650 | 25665 | 39.33 | 2.07 | 81.41 | 21.62 | 59.79 |
| Wentworth F. G. A. | 1913 | 125 | 2664 | 21.31 | 1.80 | 38.36 | 14.55 | 23.81 |
| | 1912 | 150 | 5028 | 33.52 | 1.22 | 40.89 | 18.43 | 22.46 |
| | 1911 | 100 | 1113 | 11.13 | 1.82 | 20.25 | 6.12 | 14.13 |
| Chadwick F.G.A. | 1911 | 75 | 435 | 5.80 | 2.16 | 12.52 | 3.19 | 9.33 |
| Exeter Hort'l. A. | 1912 | 100 | 6527 | 65.27 | .83 | 54.17 | 35.89 | 18.28 |
| Republic Hort'l.A. | 1911 | 400 | 9309 | 23.27 | 2.02 | 47.00 | 12.79 | 34.21 |
| Sarcoxie F. G. A. | 1913 | 300 | 13805 | 46.02 | 1.87 | 86.06 | 33.59 | 52.47 |
| | 1912 | 350 | 4314 | 12.32 | 1.81 | 22.30 | 5.67 | 16.63 |
| Seneca F. G. A. | 1912 | 425 | 18548 | 43.64 | 1.05 | 45.82 | 24.00 | 21.82 |
| Tipton Ford Berry Ass'n. | 1912 | 120 | 8039 | 67.00 | 1.03 | 69.01 | 36.85 | 32.16 |
| | 1911 | 120 | 2332 | 19.43 | 2.15 | 41.77 | 10.68 | 31.09 |
| Wheaton F. G. A. | 1912 | 125 | 2286 | 18.29 | 1.13 | 20.67 | 10.05 | 10.62 |
| | 1911 | 200 | 1028 | 5.14 | 2.20 | 11.31 | 2.82 | 8.49 |
| Monett S. W. F. G. A. | 1913 | 450 | 17055 | 37.90 | 1.81 | 68.60 | 26.90 | 41.70 |
| | 1911 | 500 | 10668 | 21.33 | 2.11 | 45.00 | 11.63 | 33.37 |

Table No. 1.

Showing Average Yield and Returns per Acre for Twenty-nine Strawberry Shipping Associations in the Ozarks, covering 15,631 Acres.

| Name of Association | Year | Total Acreage | Total Number Crates | Average Number Crates Per Acre | Average Price Per Crate | Average Gross Returns Per Acre | Cost of Harvesting Per Acre | Returns to Grower Less Harvesting Cost Per Acre |
|---------------------|------|---------------|---------------------|--------------------------------|-------------------------|--------------------------------|-----------------------------|-------------------------------------------------|
| Lancaster F.G.A. | 1913 | 200 | 1569 | 7.84 | \$1.11 | \$8.60 | \$4.31 | \$4.29 |
| Mountainburg F.G.A. | 1913 | 175 | 10458 | 59.76 | 1.01 | 60.36 | 32.28 | 28.08 |
| Peirce City F.S.U. | 1913 | 180 | 3979 | 22.10 | 2.11 | 46.63 | 16.13 | 30.50 |
| Republic F. G. A. | 1913 | 400 | 6878 | 17.19 | 1.99 | 34.21 | 12.54 | 21.67 |
| Rogers F. G. A. | 1913 | 400 | 10564 | 26.41 | 1.48 | 38.08 | 14.52 | 23.56 |
| Springdale B.G.A. | 1913 | 500 | 13868 | 27.73 | 1.35 | 37.44 | 15.25 | 22.19 |
| Verona F. G. A. | 1913 | 200 | 4369 | 21.84 | 1.82 | 39.75 | 15.94 | 23.81 |
| Diamond F. G. A. | 1912 | 110 | 4744 | 43.14 | 1.13 | 48.75 | 23.72 | 25.03 |
| LaRussell F.G.A. | 1912 | 150 | 5230 | 34.86 | 1.08 | 37.65 | 19.17 | 18.48 |
| Billings F. G. A. | 1911 | 150 | 882 | 5.88 | 2.09 | 12.29 | 4.29 | 8.00 |
| Total | | 15,631 | 533,397 | | | | | |
| Average | | 300 | | 33.78 | 1.62 | 48.72 | 20.56 | |

The figures in the above table have been taken from authentic records of the secretaries of the local associations, the Ozark Fruit Growers' Association and from the Southwest Missouri Fruit Growers' Association. The wide variation in the figures of the different associations for the same year is caused by the large number of factors which enter into the production and marketing of the strawberry crop. It will possibly throw some light on the marketing phase of the industry to mention some of the factors which favor or oppose high yields per acre. Among these are, variation in the productivity of the different soils found in the Ozarks, the different sources from which plants may be had for the original setting, variation in the thoroughness with which the land is prepared, planted and cultivated, etc.

The high yields per acre made by the Logan, Belfast, Marionville, Exeter and Tipton Ford Associations in 1912, the Marionville and Purdy Associations in 1911, and the Marionville Association in 1913, were largely the result of the thoroughness with which the members of these associations attended to the details of production. The low yields, however, are not always an indication that the reverse is true. The recorded yield represents the quantity of berries marketed rather than the quantity produced. The price of berries sometimes falls so low that in the middle of the producing season further picking becomes unprofitable. The yields may have been low because continued rains and damp weather in the picking season tend

to soften the berries and make a portion of the crop unmarketable. The associations marketing the highest yields are usually, however, the ones whose members give the most attention to the details of production.

The average yield per acre of the entire Ozark region is in no way a criterion of the commercial possibilities of the strawberry industry, because the tendency of the average farmer is to slight the preparation of the soil for setting, to set any grade of plants which can be had cheaply, and to neglect cultivation. Under favorable circumstances some growers have been able to make exceptionally high yields as is shown in the following table:

TABLE NO. 2

| <u>Name</u> | <u>Location</u> | <u>Acreage</u> | <u>Yield</u> (Crates) |
|----------------|----------------------|-----------------|--------------------------|
| Mr. Lohrer | Springdale, Arkansas | 1 | 200 |
| Henry Bettis | Neosho, Missouri | 1 | 200 |
| Samuel Renner | " " | 1 | 300 |
| J. G. Dixon | " " | 1 | 150 |
| J. P. Sharp | Granby, " | 1 | 150 |
| J. G. Eberly | Gravette, Arkansas | 10 | 2000 |
| G. E. Dorrence | Neosho, Missouri | 1 $\frac{1}{4}$ | 383 |
| Wm. Smerdon | Monett, " | 1 | 140 |
| W. R. Russell | " " | 2 $\frac{1}{2}$ | 271 |

It is not probable, however, that strawberry growers generally will ever produce average yields as high as any of those tabulated above, but it shows what can be accomplished in this region with good care.

The wide variation in price received per crate by several of the local associations during the same season was due to the combined influence of several factors involved in marketing the strawberry crop. For illustration, the difference in price of \$1.00 per crate received by the Peirce City, Missouri, Association, above that received by the Mountainbury, Arkansas, Association, in 1913, was due to the following factors:

First, the members of the Peirce City Association as a whole were more interested in strawberry production than the members of the Mountainburg Association, and for this reason gave better attention to the strawberry industry.

Second, the Peirce City Association used the standard dry measure quart, while the Mountainburg Association used the wine measure, so-called, short quart, which is outlawed in many of the principal markets. Therefore the Peirce City Association had an opportunity to distribute its crop so as to realize the highest prices.

Third, the Peirce City Association has established a reputation for its strawberries by pan grading and shed packing. On the other hand, the Mountainburg Association has given very little attention to grading and packing.

These methods will be discussed more fully later on in this paper.

Fourth, the Peirce City Association grows the Aroma variety which is adapted to their soil and climate and which commands a high price on the market. The Mountainburg Association grows the Klondyke which is better suited to their soil and climate but which does not command so high a price as does the Aroma.

As shown in Table No. 1, the associations receiving the highest average prices for the season, are those associations growing the Aroma variety, giving special attention to grading and packing, using the standard dry measure quart cups and using the best selling agencies for distribution.

The cost per acre of harvesting has been fairly uniform throughout the entire Ozark region. The prices of various crates and the cost of harvesting for the season of 1913, are given in the following table:

TABLE NO. 3

| | American Ventilated | Standard Leslie | Wine Measure |
|-------------------|------------------------|-----------------|--------------|
| Crate | 20¢ | 18¢ | 14¢ |
| Picking | 48¢ | 48¢ | 36¢ |
| Packing & hauling | <u>5¢</u> | <u>5¢</u> | <u>5¢</u> |
| TOTAL | 73¢ | 71¢ | 55¢ |

The cost of picking is practically uniform for any given crate throughout the Ozark region. The variation in the cost per crate of harvesting for each association as shown in Table No. 1 was due to the fact that some of the associations used the wine measure crate, while others used the standard dry measure crate. However, the merits of the various packages are discussed in detail in the chapter, "Styles of Packages."

The factors which influence the net profits per acre in the strawberry industry are divided into two classes: the factors influencing the cost of production, and the factors involved in marketing the crop. The cost of production of strawberries varies due to the differences in ability of the individual farmers to manage the work, the variations in cost of preparing and cultivating different types of soils, cost of plants used in the original setting, and the keenness of interest and enthusiasm which the individual farmer displays.

An attempt made to determine the average cost of production per acre revealed the fact that only a small proportion of the growers keeps such records. These were the most progressive growers who maintain their plantations in the best condition. However, the cost of production including interest on the investment in land and machinery has been as low as \$15.00 per acre in a few instances, and as high as

\$65.00 per acre in others. Therefore an average of their cost figures is too high to represent the average cost of production by the whole group.

VARIETIES.

A large number of varieties have been grown in the Ozark region for commercial purposes. At the present time, (1914) only three varieties - the Aroma, Klondyke and Candy - have met successfully the requirements of the grower for productiveness, of the market-man for carrying qualities, and of the consumer for quality and appearance. Other varieties have been favored for a few years but have been discarded because they failed to meet all of the above requirements. The Michael was for a time popular because of its high dessert qualities, but has been discarded because it is too soft for long shipment and often too small to meet market demands. The Crescent and Lady Thompson were at one time widely grown in the Ozark region, but both were discarded because they did not fully meet the three essential market requirements mentioned above. The Warfield, Haverland, and Dunlap are yet grown at a few points in the Ozarks. A large number of growers at Monett, favor the Warfield and Dunlap varieties even though they are forced to take twenty-five to fifty cents per crate less than is paid for the Aroma. They hold that the Warfield and Dunlap varieties yield more crates per acre than the Aroma and even at the lower price are more profitable per acre to the grower. However, none of the Warfield and Dunlap advo-

cates could produce records of actual yields and sales. The writer attributes the low returns of the Pomona Strawberry Association in 1912 and 1913, as shown in Table No. 1, to growing the Warfield variety and to the use of the Leslie standard crate which does not have proper ventilation.

The Aroma, Klondyke and Gandy assume a deep red color in the field and at the same time maintain their firmness of texture. The Klondyke is favored in the section of the Ozarks south of the state line between Arkansas and Missouri. The Aroma is the favorite north of this line. The Gandy is a late season berry which is grown profitably in all sections of the Ozark region. The final test of any strawberry variety to the grower's mind is its returns in net profits. The strawberry growers of South Missouri have adopted the Aroma and Gandy and the growers of North Arkansas have adopted the Klondyke and Gandy because these varieties have yielded the highest net profits per acre in comparison with all other known varieties.

Dr. E. L. Beal (1) Republic, Missouri, says: "I have personally tested out one hundred twenty-seven varieties, and after this crop is picked (1913) I will be growing just two varieties; those are the Aroma and Gandy." Dr. Beal also says: "I do not know how there can be a better all round berry than the Aroma, but perhaps there will. The Aroma is ideal."

Mr. McNallie (1) of Sarcoxie, Missouri, after testing

two hundred varieties of strawberries in the field says: "The newer varieties of strawberries have driven the older varieties out and we have come down to this time where we have practically only the Aroma in this territory. It is grown almost exclusively as a commercial berry."

TIME AND MANNER OF PICKING STRAWBERRIES.

In this investigation much attention was given to the question of the stage of ripeness the berries should reach for picking. The instructions given by the various associations in regard to the time of picking are by no means uniform. As a result of this lack of information, one association may load out a car of strawberries half green thinking that they will color and mature enroute, while another association may load a car of fully ripe stock thinking that the refrigeration will maintain the original quality of the berries over a long haul.

From personal study of strawberries while they were being loaded and of the condition in which they arrive on the market, and from the opinions of growers, shippers and marketmen, the writer recommends that strawberries for general shipment in refrigerator cars be picked at a time when the berries are three-fourths to fully colored. Each berry should be picked with a stem from one-half to three-fourths of an inch long. In order to avoid bruising the tender skin of the berry, the picker should not touch the berry with the

fingers, but use the stem to transfer it from the vine to the container. Strawberries should reach full flavor in the field before being picked for market, because they gain no additional flavor during the journey to market under refrigeration. It is generally conceded that the strawberry has full flavor when it is from three-quarters to fully colored. It was formerly considered bad practice to pick strawberries early in the morning while the dew was on the fruit, but experience has shown that strawberries picked in the cool of the morning even though covered with a heavy dew, carry better than berries picked in the heat of the day. This is due to the fact that strawberries picked early in the morning are not exposed to the direct heat rays of the sun.

GRADING AND PACKING STRAWBERRIES.

Strawberries, being highly perishable and easily bruised, do not readily lend themselves to the grading and packing systems used for other kinds of perishable fruit. However, the Peirce City Fruit Growers' Association has worked out a system of grading which does not appreciably bruise the fruit or injure its carrying qualities. This method was also used successfully during the season of 1913 by the Butterfield and Republic Strawberry Shipping Associations. This system of grading and packing is very simple, is easily learned and is comparatively inexpensive to the grower. The details of the pan grading and shed packing system as used continuously for the last eight years by the Peirce City, Missouri, Strawberry

Association are as follows:

The pickers in the field bring the strawberries to the shed in carriers holding four, six or eight quart cups. The berries are transferred from the carriers to a level top table and arranged conveniently for the graders. Each cup of strawberries is emptied into a grading pan twelve inches long by ten inches wide at the back and five inches wide at the mouth. By a quick, shaking movement the berries are spread out over the bottom of the grading pan in a single layer so that each individual specimen of the entire quart may be seen. The culls, such as overripe, green and knotty berries are then thrown out. This leaves the best berries, untouched by the hands of the grader, in the bottom of the grading pan, ready to be poured back into the original quart cup. The benefits of this system are clearly shown in a comparison of the returns of the Peirce City Association and the Sarcoxie Association. The Peirce City and Sarcoxie Associations are only twelve miles apart and have similar soil and weather conditions. These associations grow the Aroma variety exclusively, use the same kind of crates, have the same system of inspection and loading, and sell through the same central distributing association. The members of the Sarcoxie Association have never during the last eight years systematically pan graded and shed packed their strawberries, while the members of the Peirce City Association have carefully graded and packed each quart.

The following table gives the average price per crate received by each association and the premium which the Peirce City Association received above the Sarcoxie Association:

TABLE NO. 4

| Year | Average Price Per Crate Peirce City | Average Price Per Crate Sarcoxie | Premium Peirce City Above Sarcoxie |
|---------|-------------------------------------------|----------------------------------------|------------------------------------------|
| 1913 | \$2.01 | \$1.87 | \$.14 |
| 1912 | 1.38 | 1.26 | .12 |
| 1911 | 2.26 | 2.00 | .26 |
| 1910 | 2.47 | 2.27 | .20 |
| 1909 | 2.01 | 1.77 | .24 |
| 1908 | 2.02 | 1.78 | .24 |
| 1907 | 2.28 | 1.79 | .49 |
| 1906 | <u>1.79</u> | <u>1.50</u> | <u>.29</u> |
| Average | 1.95 | 1.72 | .23 |

The cost of pan grading and shed packing has varied between two and one-half and ten cents per crate according to the cost of labor and the condition of the berries at the time of grading. Mr. R. F. George, Ex. Manager of the Peirce City Association, says: "We have estimated that five crates to the culler can be handled an hour, or fifty crates a day, and the wages are something like \$1.25 per day." Mr. R. P. McReynolds of the Peirce City Association says that the cost of pan grading during a series of five or six years has approximated five cents per crate. So far as the writer could estimate from personal

observation the loss of cull berries under the system of pan grading used by the Peirce City Association did not ordinarily exceed one quart in twenty-four quarts graded. The cost of pan grading, approximately five cents per crate, and the loss of berries thrown out as culls (approximately one quart), if valued at average price of ungraded berries, six cents a quart, makes a total of eleven cents. This amount subtracted from the premium of twenty-three cents, leaves a net profit of twelve cents per crate to the members of the Peirce City Association due to the system of pan grading.

A few days before the shipping season of 1913, a hail storm destroyed a large part of the strawberry crop in and around Republic, Missouri. Dr. E. L. Beal, Secretary of the Republic Association, stated that had it not been for the grading which made it possible to throw out the hail marked and cull berries, the members of the Republic Strawberry Association would have been unable to market more than a very small part of their crop. As a result of pan grading, fifteen car loads (more than half the normal crop of the Republic Association) were marketed at \$1.99 per crate, or nineteen cents above the general average of the Ozark Fruit Growers' Association for the same season.

The Butterfield Association adopted the pan grading system in 1913 with the result that their average price for the season was twenty-five cents above the general average price for the same season of all associations selling through

the Ozark Fruit Growers' Association, whereas in the two previous years (1911-1912), the average price received by the Butterfield Association had exceeded that of the Ozark Fruit Growers' Association only one cent per crate.

STYLES OF PACKAGES.

Formerly there were very few laws or regulations in regard to the weight and measure of packages used for shipping strawberries, but with the advent of the pure food law, popular sentiment has turned toward full measure packages for all kinds of fruit and produce. Up to and including 1911, the strawberry growers of the Ozark region used a crate holding 24 liquid measure quart cups (each containing $57\frac{3}{4}$ cubic inches) commonly known as the Leslie crate. Popular sentiment demanded a dry measure cup (containing 67.2 cubic inches). For this reason, the growers and shippers began to try new kinds of packages. The growers were unfamiliar with market conditions and naturally were slow to adopt a standard package, consequently there were several kinds of crates in use during the seasons of 1912 and 1913 resulting in confusion and actual loss to the grower. For illustration, a car of strawberries was loaded during the season of 1913, at Rudy, Arkansas, with four different kinds of crates. In loading, it was difficult to arrange the crates satisfactorily on account of their different shapes; furthermore, no one would buy the car at the regular price received that day when either kind of package was used exclusive-

ly. The car was finally sold at a considerable loss to the growers. The growers are anxious to use the best kind of package but they have no reliable way of ascertaining the real demands of the market. The market-men know the kind of crate that will meet the legal requirements and suit the demand of their own particular market, but they are not in a position to say that their particular preference is suited to other markets.

In order to properly co-ordinate the demands of the different markets, a thorough knowledge is needed of market conditions in all the cities of the United States, handling Ozark strawberries. A personal visit was made to Oklahoma City, St. Louis, Kansas City, Minneapolis, St. Paul, Des Moines, Chicago, and New York, these being considered representative markets. In addition four hundred letters were written to commission men who handled strawberries and were in a position to know from experience the kind of packages best suited to their particular market conditions. From the four hundred letters, ninety-three replies were from representative firms who handled Ozark strawberries and were interested in establishing a uniform strawberry package for the Ozarks. A summary of the ninety-three replies shows that the American Ventilated* crate is preferred above all others.

*Detailed description given in Appendix.

TABLE NO. 5

Summary of Replies from Marketmen
in Regard to Strawberry Package.

- 70 preferred American Ventilated crate.
- 7 " Leslie Standard Dry Measure crate.*
- 1 " Leslie Wine Measure crate.*
- 4 " St. Louis crate.*
- 1 " Hallock crate.*
- 1 said that the American Ventilated and St. Louis crates were equally acceptable.
- 1 " " in his market both the American Ventilated and Hallock crates were, equally acceptable.
- 8 " " both the American Ventilated and Leslie Standard crates were equally acceptable in their markets.

It is significant that 75 per cent of the replies indicate a preference for the American Ventilated crate. Only one market shows a preference for the wine crate under present legal requirements and market conditions. The market men were also asked to state whether there were city or state laws regulating size of package in their markets. A summary of the replies is as follows:

*Detailed description given in Appendix.

Commission market men operating under city and state laws regulating size of strawberry package- - - - - 56

Operating under city regulations alone - - - - - 9

Operating without state laws - - - - - 33

Operating without city regulations- - - - - 25

A list of states having laws regulating the size of the strawberry package has been compiled from three sources:

First, an investigation made by the Bureau of Markets of the United States Department of Agriculture.

Second, a personal examination of the laws of Iowa and Minnesota.

Third, an article prepared by the editorial staff of the Kansas City Packer (4).

The states having laws which establish the dry measure quart as the legal standard for strawberries are listed in the following table:

TABLE NO. 6

| | |
|-----------|---------------|
| Nevada | Pennsylvania |
| Nebraska* | Delaware |
| Wisconsin | New York |
| Indiana | New Jersey |
| Iowa | Maryland |
| Ohio | Massachusetts |
| Minnesota | Rhode Island |
| Michigan | New Hampshire |

*Nebraska requires dry measure, or if other state is used, it must be labeled as stated.

It is possible that some state officers may be lax in the enforcement of these laws but the fact remains that the laws are on the statute books and can be enforced at any time. According to Mr. O. C. Bryant, Chairman, Committee on Weights and Measures, Milwaukee Produce & Fruit Exchange: "The Wisconsin law provides that berries can be sold only in boxes containing not less than 67.2 cubic inches. No tolerance is allowed. By special act of the Legislature we were allowed to sell boxes that were short not more than 7%, but only for the season of 1913. From now on, we must have full measure. No tolerance allowed in Wisconsin."

During the season of 1913 the states which now have laws prohibiting the sale of the wine measure crates, consumed 378 cars or 51% of the total shipments of the Ozark crop.

It will thus be seen that more than 50 per cent of the best markets which receive the Ozark strawberry crop are now closed to the wine measure crate. About an equal number of American Ventilated and of wine measure crates were shipped from Ozark associations during the season of 1913.

In the following table a comparison is made of the total number of each kind of crate sold, daily, of the total receipts and of the average price per crate of the three different kinds of crates used in 1913.

TABLE NO. 7

Showing the Daily Difference in Prices of
Wine, American Ventilated and Leslie Dry Crates.

| Date | Wine Crate | | | American Ventilated Crate | | | Leslie Dry Crate | | |
|-------|------------|--------------|--------|------------------------------|--------------|--------|------------------|--------------|--------|
| | Number | Av. Price | Total | Number | Av. Price | Total | Number | Av. Price | Total |
| 1913 | | | | | | | | | |
| May | | | | | | | | | |
| 6 | 576 | \$1.32 | \$ 747 | | | | | | |
| 7 | 950 | 1.85 | 1760 | 465 | \$2.00 | \$ 975 | | | |
| 8 | 480 | 1.23 | 585 | 450 | 1.60 | 720 | | | |
| 9 | 2041 | 1.50 | 3060 | 1246 | 1.67 | 2080 | | | |
| 10 | 4181 | 1.30 | 5439 | 1247 | 1.62 | 2019 | | | |
| 11 | 1881 | 1.10 | 2068 | | | | | | |
| 12 | 6945 | 1.31 | 9008 | 1562 | 1.30 | 2027 | | | |
| 13 | 5745 | 1.29 | 7383 | 210 | 1.25 | 262 | | | |
| 14 | 5142 | 1.32 | 6780 | 1538 | 1.25 | 1923 | | | |
| 15 | 5095 | 1.33 | 6784 | 448 | 1.25 | 560 | 450 | \$1.40 | \$ 630 |
| 16 | 4516 | 1.33 | 5993 | 1067 | 1.21 | 1288 | 450 | 1.40 | 630 |
| 17 | 4804 | 1.32 | 6358 | 1383 | 1.63 | 2258 | 900 | 1.43 | 1287 |
| 18 | 2440 | 1.44 | 3231 | 1221 | 1.58 | 1930 | 450 | .82 | 368 |
| 19 | 8956 | 1.49 | 13315 | 2312 | 1.88 | 4348 | 3272 | 1.76 | 5750 |
| 20 | 8735 | 1.64 | 14332 | 5388 | 1.97 | 10584 | 1800 | 1.46 | 2622 |
| 21 | 7524 | 1.79 | 13163 | 5398 | 2.06 | 11092 | 1350 | 2.08 | 2815 |
| 22 | 9990 | 1.78 | 17836 | 10354 | 2.02 | 20934 | 2550 | 1.82 | 4640 |
| 23 | 7665 | 1.81 | 13872 | 7668 | 2.02 | 15502 | 1800 | 1.52 | 2740 |
| 24 | 8430 | 1.83 | 15460 | 12136 | 2.02 | 24582 | 2883 | 1.83 | 4470 |
| 25 | 5607 | 1.75 | 9832 | 4985 | 1.90 | 9459 | 3378 | 1.79 | 6027 |
| 26 | 10824 | 1.74 | 18870 | 11240 | 1.76 | 19823 | 900 | 1.45 | 1304 |
| 27 | 7014 | 1.72 | 12082 | 12775 | 1.86 | 23792 | 2245 | 1.79 | 4024 |
| 28 | 4992 | 1.81 | 9045 | 10708 | 1.92 | 20606 | 2289 | 2.10 | 4815 |
| 29 | 4421 | 1.79 | 7908 | 6648 | 1.92 | 12715 | 2034 | 1.69 | 3433 |
| 30 | 2238 | 1.82 | 4065 | 7372 | 1.93 | 14228 | 1200 | 1.86 | 2230 |
| 31 | 4290 | 1.85 | 7935 | 5965 | 1.99 | 11822 | 1557 | 1.88 | 2923 |
| June | | | | | | | | | |
| 1 | 526 | 1.85 | 972 | 1925 | 2.03 | 3903 | | | |
| 2 | 718 | 1.93 | 1387 | 2412 | 2.20 | 5300 | 450 | 2.25 | 1010 |
| 3 | | | | 1653 | 2.28 | 3765 | | | |
| 4 | 93 | 2.20 | 205 | 808 | 2.35 | 1900 | 462 | 2.35 | 1088 |
| 5 | 262 | 2.20 | 576 | 1136 | 2.35 | 2270 | | | |
| 6 | | | | 448 | 2.35 | 1055 | | | |
| 7 | | | | 448 | 2.35 | 1055 | | | |
| 9 | | | | 449 | 2.35 | 1057 | | | |
| Total | 136881 | Av. 1.61 | 220351 | 123065 | Av. 1.92 | 236304 | 30420 | Av. 1.74 | 52813 |

The American Ventilated crate of 24 quarts contains 1612.8 cubic inches, while the wine measure 24 quart crate holds only 1386 cubic inches, the difference in content of the two packages being 226.8 cubic inches or approximately 3-1/3 dry measure quarts. In comparing the cost of harvesting and marketing strawberries in the American Ventilated crate and in the wine measure crate, and in making a comparison of the season's profits from each style of package, the difference in content should be charged against the American Ventilated crate.

The differences in cost of harvesting (including package) and the extra cost of the additional content between the American Ventilated and the Leslie wine crate may be summarized as follows:

TABLE NO. 8

| | | |
|---------------------------------------------------|------------|------------|
| Difference in content of 3-1/3 qts. at 5¢ per qt. | | .16-2/3 |
| Cost of American Ventilated crate made up | .20 | |
| " " Wine crate made up | .14 | |
| Difference | <u>.06</u> | .06 |
| Cost picking American Ventilated full quarts | .48 | |
| " " Leslie Wine full quarts | .36 | |
| Difference | <u>.12</u> | <u>.12</u> |
| Total difference in cost | | .34-2/3 |

By transferring the contents of the Leslie Wine measure crate to the American Ventilated crate, Mr. T. F. Starcher, of Aroma, Mo., found that the additional amount of strawberries needed to completely fill the American Ventilated crate was slightly over two quarts. The actual difference then instead

of being 3-1/3 quarts should apparently be figured at 2½ quarts.

The only objection to the American Ventilated crate is that the first two layers must be removed before the bottom layer can be inspected. This, however, is not a serious objection, because it is necessary to remove at least one layer to inspect the entire content of any of the other style packages.

It will be noted from Table No. 7 that the greatest difference in price was on May 19th when the American Ventilated crate sold for an average of 39 cents more than the wine crate. On May 16th the wine measure crate sold for 12 cents more than the American Ventilated. This daily fluctuation of price may be due to differences in local conditions such as a variation in weather, loading facilities, delays, difference in varieties, etc. The season's averages will overcome the daily fluctuations and give a reliable comparison of the returns for each kind of crate. The season's difference of 31 cents in favor of the American Ventilated crate will approximately balance the additional cost of harvesting (including package) and the greater quantity of berries required for the dry measure crate.

Thus the preference for the American Ventilated crate is not based on the comparative market returns in 1913 for each style of crate, but upon the fact that the best markets of the United States have been closed to the sale of the wine measure style crate.

The Leslie Standard crate has been generally condemned because it is so compactly built that it does not permit

proper ventilation. The average returns for the Leslie Standard crate for the season of 1913 were 18 cents below the average of the American Ventilated crate. The cost of harvesting and marketing the Leslie Standard crate is approximately the same as that of the American Ventilated crate.

The Leslie Wine crate is undesirable because it is illegal in markets which handled 57.5% of the 1913 Ozark strawberry crop.

It is apparent that the American Ventilated crate is best adapted to the needs of the Ozark strawberry growers and the market-men. This is because it fulfills the legal requirements of every market in the United States, is preferred by a large majority of the markets handling Ozark strawberries, provides better ventilation than any other style of crate of standard size, and there is no serious objection to it from any standpoint.

METHODS OF SELLING USED

IN MARKETING THE OZARK STRAWBERRY CROP.

In the early days of the strawberry industry, the problems of marketing were purely local because car load shipments were unknown. The grower who over-estimated the demands of the nearby markets was left with his surplus a dead loss on his hands. The methods of distribution and transportation have been so perfected that now the demand is not always fully satisfied even with a supply of over one thousand car loads of strawberries a year from the Ozark region.

The successful marketing of the strawberry crop depends upon its proper distribution. If a market which ordinarily takes three cars a day is supplied with six cars, there is a corresponding break in price with the result that often no profit is realized. A few small growers have built up a trade in nearby towns which they supply by local express without refrigeration. This business amounts to several thousand crates a year in the aggregate, but is limited to adjacent markets which are easily over-supplied.

There are three methods of selling strawberries in use in the Ozark region:

1. Selling to a local buyer.
2. Selling through independent local associations.
3. Selling through the large associations made up of affiliated local associations.

Local Buyers.

The strawberry acreage of the Ozark region is made up principally of small plantings ranging in size from one to twenty acres. Large plantings of fifty, one hundred, or two hundred acres are seldom attempted. There are several points where these large plantings have failed because it was unprofitable to handle the immense amount of detail labor required for setting plants, hoeing, cultivation and picking on such a large scale.

Since the small grower cannot dispose of his crop alone, it is necessary for him to sell locally, or join a

local Fruit Growers' Association and ship his berries with those of the other members of the association. The local buyer usually pays the farmer cash for his berries. The members of the local association, however, are often forced to wait for their returns until their car is delivered and sold. This fact enables the local buyer to operate in a community where there is a strong local association. There are a few local buyers in the Ozarks who have a wide acquaintance with the strawberry trade built up through long years of experience. For this reason, the local buyer well established can usually pay almost as much as the grower could realize shipping through the association. However, this method does not tend to build up the community whereas the association method brings the farmers into personal contact in a business and social way and makes for a better country life.

Independent Local Fruit Growers' Associations.

The local associations were organized primarily to handle the berries of the small growers in car lots daily. Most of the local associations in the Ozark region are incorporated stock companies, the stockholders being the strawberry growers. A few local associations are unincorporated, co-operative bodies in which each farmer shares in the expenses and the profits in proportion to the quantity he ships. The only advantage in favor of the incorporated association is that it is generally considered by business men to be a more stable form of organization.

As the local associations are operated in the Ozarks at present, the management of each association has charge of the details of inspection, grading and loading. Crates are often bought and distributed to its members by the local association. Associations affiliated with the central selling agencies do not ordinarily attend to the details of selling; however, membership in the central association does not take away from the local association the right to sell its own output, if it can advertise its special pack and get a better price per crate than the regular price for the day.

The management of the independent local associations usually sells each day's output without any cooperation whatever with the other associations. The management of the independent association is handicapped in that it is too expensive for any one local association to maintain personal representatives in the principal markets, and all information must be obtained by them through parties interested in buying rather than from unbiased personal representatives.

A personal examination was made of the records of two local associations in Northwest Arkansas, one affiliated with the Ozark Fruit Growers' Association, and the other operating independently. The soil, the climate, the weather, the season of shipping, the crates, the methods of grading and packing, and the variety of berries were practically the same for both associations. The records show that the association affiliated with the Ozark Fruit Growers' Association received

\$1.47 net per crate, as compared with \$1.35 net returns per crate received by the independent association. In this particular instance, knowing the management of the two associations personally, the writer could find no other reason for the difference of 12¢ per crate except the better selling methods of the large central association. However, most of the independent associations are able to sell for practically the same price each season as the central association because the latter controls more than seventy-five per cent of the crop and maintains an equitable distribution in all the principal markets of the United States.

The management of some of the local associations maintains that the demand for Ozark strawberries is so great that each association could distribute independently and still not over supply any one market. They base this statement on the fact that there has been during the last five or six years enough buyers on the ground to take the entire crop and that the buyers will maintain proper distribution.

So long as a strong central association distributes seventy-five per cent of the crop, this argument holds good, but if all locals were shipping independently, it is the writer's opinion that the distribution would soon be in the chaotic condition that it was in 1903 and 1904 before the organization of the Ozark Fruit Growers' Association.

The Affiliated Central Distributing Associations.

There are two central distributing associations in the Ozark region, the Ozark Fruit Growers' Association, and the Southwest Missouri Fruit Growers' Association. The Ozark Fruit Growers' Association is a stock company, organized in 1905 by G. A. Atwood of Springfield, Mo., to distribute perishable fruit grown in the Ozark region. This Association backed by such prominent fruit growers as Capt. Geo. T. Lincoln, Bentonville, Arkansas, Robert Hitt, Koshkonong, Mo., M. F. Smeltzer, Van Buren, Arkansas, Dr. E. L. Beal, Republic, Mo., P. A. Rogers, Gravette, Arkansas, and Louis Erb, Cedar Gap, Mo., was successful from the beginning. While the Ozark Fruit Growers' Association has handled apples and peaches, its reputation for efficiency is based upon the work done in distributing the strawberry crop. The Ozark Fruit Growers' Association is today recognized as the best strawberry distributing agency in the Ozark region. Although the Ozark Fruit Growers' Association is a stock company, it depends upon the local shipping associations for its existence. Each local association shipping through the Ozark Fruit Growers' Association may own stock in the latter and have a voice in its management. Some of the local associations avail themselves of this opportunity, while others do not. No dividend has ever been paid to the stock holders of the Ozark Fruit Growers' Association because the commissions charged for its distributing services have never been more than the actual expenses

plus enough to make a small reserve of two thousand dollars or less.

The Ozark Fruit Growers' Association handled during the first year of its existence five hundred and twenty cars of strawberries, representing the total output of thirty-four local associations, out of a total of approximately forty-two for the entire Ozark region. The number of associations affiliating has varied from year to year, but its system of distribution has been maintained at all times.

Under the system used at present by the central distributing associations, all the details of harvesting, inspection and loading, are left entirely to the responsibility of the local association and its members. The responsibility of the central distributing association begins as soon as notice is served the central office that a car is properly loaded and ready for shipment. The central office of the Ozark Fruit Growers' Association is truly a central office. The manager of the distributing association keeps in touch with the manager of each affiliated local association either by telephone or telegraph. At the same time, he is keeping in touch with his personal representatives in the principal markets. He knows from long experience about how many cars any particular market can dispose of at a certain price. Each day he has a list of points of origin and the number of crates in each car ready for shipment at each local shipping point. He distributes the day's output so as to avoid sending an over

supply to any one market. From fifteen to twenty buyers representing jobbers and wholesalers in the different markets are usually on hand to inspect and buy for their respective markets. These buyers are well informed as to market conditions and buy where they can get the best bargain.

It has been the policy of the central distributing associations to sell every car f. o. b. for cash, but at first there were very few buyers who would risk paying cash for a car load of strawberries when it was very probable that his competitor would get a car on consignment. Obviously the merchant with consigned fruit could under sell his competitor who had paid cash. When the buyers knew that the Ozark Fruit Growers' Association had control of seventy-five per cent of the entire crop and would protect their market from consigned cars, they were willing to pay cash on track at loading point.

The record of the sales of the Ozark Fruit Growers' Association since 1905 shows the results of this policy.

TABLE NO. 9

| Year | Cars Consigned | Cars Sold on Track |
|------|----------------|--------------------|
| 1905 | 294 | 226 |
| 1906 | 273 | 293½ |
| 1907 | 10 | 253 |
| 1908 | 37 | 166 |
| 1909 | 33 | 364 |
| 1910 | 5 | 188 |
| 1911 | 28 | 262 |

Table No. 9 (con't'd.)

| Year | Cars Consigned | Cars Sold on Track |
|------|----------------|--------------------|
| 1912 | 158 | 469 |
| 1913 | 35 | 466 |

It is interesting to note that in its first year (1905) more cars were consigned than were sold on track. The next year (1906) the figures were reversed, a few more cars were sold than consigned. In 1907-8-9-10 and 11 the demand was so strong that practically the entire crop was sold on track, but in 1912 there was a heavy crop and there were more cars consigned in that year than were consigned in the five previous years combined. The crop dropped off slightly in 1913 and as a result only thirty-five cars were consigned out of a total of five hundred and one for the season. The question is often asked: "Is it more profitable to consigned than to sell?" In comparing prices of fruit consigned with prices of that sold on track, it should be borne in mind that as a rule the buyers on the ground choose the best cars, leaving the poorest cars to be consigned. It might be supposed that the most economical method of selling is to consign thereby saving the salary and expenses of the traveling buyer. But in actual practice it has been proven by experience that it is more profitable and more satisfactory to the grower to sell on track for cash.

The SouthWest Missouri Fruit Growers' Association was organized in 1913 with eight local associations affiliating.

Its system of distribution is similar to that of the Ozark Fruit Growers' Association.

Factors which have been responsible for the success of the central distributing associations are:

First. The business ability of the manager.

Second. The organization of local associations to handle details of production and harvesting.

Third. Maintaining personal representatives in the principal markets of the country to secure first hand information as to market conditions and to look after the interests of the association.

Fourth. Maintaining an office throughout the year to keep in touch with market conditions.

Fifth. The principle of selling f. o. b. loading point for cash.

Sixth. System of protecting track buyers by preventing consignments to their markets so far as the central distributing associations are concerned.

Suggestions for improving the service of the central distributing associations are:

First. Change the present organizations into central cooperative associations in which each local association member shares in profits and losses according to the amount of business transacted through the central association for the season.

Second. The central distributing associations should select all local inspectors. These inspectors should be paid

by the central associations, and be responsible to them.

Third. Each local association should appoint an instructor to teach better methods of grading and packing.

METHODS OF INSPECTION.

Inspection at the loading shed is practiced by every strawberry association in the Ozarks. This is necessary because any farmer is admitted to membership in the local association who pays his dues and observes the rules and regulations of the association. Therefore, each day's shipment is made up of the entire picking of every member of the association. Some farmers by careful methods of picking and packing put up a uniform grade, while others by careless methods allow enough low quality berries to go into the quart cups to ruin the uniformity of the pack. The system of inspection at the loading shed now in use in the Ozark region depends for its efficiency upon the inspector. The reputation of any given local association is maintained by the thoroughness with which the local inspector eliminates the badly packed crates. On the other hand, if the inspector is inexperienced in handling strawberries, or is weak morally he is liable to approve and load strawberries of inferior quality. The strawberries are picked, graded and packed under the supervision of the grower who hauls the finished crates to the association loading shed for inspection and loading. The berries are inspected and classified or rejected, In case of rejection the owner has a right to regrade and offer for a later inspection. Some associations classify the differ-

ent grades as A, B and C, while others have only two grades. It is best to have at least two grades because one grower may have an old field in which the berries are sound yet well colored, but small, while another may have a field in new ground in which the berries are large, softer and well colored.

As inspection is carried on at the present time, each local inspector maintains the highest quality for the A, B and C grades, which the day's output of berries justifies. That is, the standards often vary from day to day as the quality of the berries varies. No systematic attempt has yet been made to standardize the grades A, B and C for the entire Ozark region. To do this it would be necessary to call all the local inspectors into a conference before the season opens and agree upon specified standards. To maintain any set standards which might be adopted the inspector of each association, or some one selected especially for that purpose, should act as instructor and give personal instruction in regard to picking, grading, packing and hauling, to every member of the local association. A visit to the berry fields while the picking was in progress and the field sheds while the grading and packing were being done, revealed the fact that many farmers were ready and willing to put up a good pack, but they did not know the requirements of the different standards or how to grade and pack to meet these requirements. Instruction by actual demonstration in the field is appreciated by the farmers and is usually put into practice. The writer while on an inspection trip with the traveling in-

spector of the Ozark Fruit Growers' Association found a farmer who had bought grading pans for his shed force, but had failed though lack of knowledge on his own part to instruct them in the proper use of the pans.

The inspector of each local association is elected by the members of that particular association and is responsible to them only. Occasionally he is visited by the traveling inspector of the large central distributing association who exercises advisory functions only. As a result there is a lack of uniformity in the quality of the cars sent out from the different shipping points in the Ozarks. This lack of a uniform standard of requirements may lead to the approval of shipments which are inferior in quality. This is by no means of frequent occurrence but shows the weakness of the present system of inspection.

The selection of an inspector from outside the immediate neighborhood, or an exchange of local inspectors, so that no inspector would have to pass on strawberries belonging to his neighbors, would considerably strengthen the present system of inspection. This together with the adoption of minimum requirements for certain grades would assure uniformity of grade throughout the Ozark region.

DISTRIBUTION OF THE STRAWBERRY CROP.

The proper distribution of the strawberry crop is a most important factor in the success of the strawberry industry

in the Ozarks. The field of distribution, judging from the movement of strawberries in the last few years, is largely in the states of Minnesota, Wisconsin, Illinois, Nebraska, Kansas, North Dakota, South Dakota, Missouri and Colorado. However, strawberries have been shipped as far west as Butte, Montana, and Denver, Colorado, and as far east as New York City.

The following table has been arranged to show the movement and distribution in detail of the Ozark strawberries in 1913.

The entire movement for each day from the beginning of the season, May 6, to the end of the season, June 9, of forty-two different associations is shown separately for each association. The tabulation is so arranged that the horizontal columns after each date show the entire distribution of strawberries for that particular day. The perpendicular columns give the entire movement of each local association, showing the kind of crate used, the number of crates, the kind of car used, the destination of the car and the price per crate.

The foregoing table shows that ninety-six per cent of the Ozark strawberry crop in 1913 moved during the month of May.

It will be noted from the table that each day's shipments were widely scattered throughout the principal markets of the central part of the United States. For illustration, at the height of the season, May 24th, fifty-six cars were distributed as follows:

TABLE NO. 11

| | |
|-------------------------|--------|
| Chicago, Illinois | 9 cars |
| Minneapolis, Minnesota | 6 cars |
| Topeka, Kansas | 4 cars |
| Des Moines, Iowa | 4 cars |
| Oklahoma City, Oklahoma | 2 cars |
| Lincoln, Nebraska | 2 cars |
| Omaha, Nebraska | 2 cars |
| Winnipeg, Canada | 2 cars |
| Sioux City, Iowa | 2 cars |
| Milwaukee, Wisconsin | 2 cars |
| Detroit, Michigan | 2 cars |
| Mason City, Iowa | 1 car |
| Burlington, Iowa | 1 car |
| Kansas City, Missouri | 1 car |
| Pueblo, Colorado | 1 car |
| Toledo, Ohio | 1 car |
| St. Joseph, Missouri | 1 car |

| | |
|------------------------|-------|
| Davenport, Iowa | 1 car |
| Denver, Colorado | 1 car |
| Salina, Kansas | 1 car |
| St. Paul, Minnesota | 1 car |
| Fon Du Lac, Wisconsin | 1 car |
| Mankato, Minnesota | 1 car |
| Buffalo, New York | 1 car |
| Duluth, Minnesota | 1 car |
| Quincy, Illinois | 1 car |
| Grand Rapids, Michigan | 1 car |

This one day's output of strawberries was distributed in twenty-eight different markets covering territory between Buffalo, New York, and Denver, Colorado, and Winnepeg, Canada, and Oklahoma City, Oklahoma.

Markets in the principal cities of Iowa, Minnesota, Nebraska, Wisconsin, Illinois, North Dakota, Missouri, Kansas and Colorado consumed five hundred and seventy-five cars of Ozark strawberries in 1913, or $87\frac{1}{2}$ per cent of the entire crop (656 cars) of the Ozarks. The same markets in 1912 took 84.8 per cent of the output of the Ozark Fruit Growers' Association.

The distribution by states for the entire crop of the Ozark region in 1913 and for the output of the Ozark Fruit Growers' Association in 1912 was as follows:

TABLE NO. 12

| <u>State</u> | <u>Cars</u> <u>1913</u> | <u>Cars</u> <u>1912</u> | <u>State</u> | <u>Cars</u> <u>1913</u> | <u>Cars</u> <u>1912</u> |
|--------------|----------------------------|----------------------------|--------------|----------------------------|----------------------------|
| Iowa | 106 | 86 | New York | 22 | 8 |
| Minnesota | 95 | 79 | Oklahoma | 17 | 21 |
| Nebraska | 73 | 67 | Michigan | 16 | 41 |
| Wisconsin | 62 | 58 | South Dakota | 8 | |
| Illinois | 60 | 84 | Texas | 8 | 19 |
| North Dakota | 60 | 41 | Canada | 5 | |
| Missouri | 51 | 50 | Ohio | 3 | 6 |
| Colorado | 35 | 34 | Montana | 1 | |
| Kansas | 33 | 32 | Indiana | 1 | |

Very few cars of Ozark strawberries are sold in the Eastern states because of competition from the strawberry growing sections in the Atlantic Coast States.

Very few cars are sold in the South because the southern markets are supplied at this season of the year with home grown fruits and vegetables.

The haul to the Pacific Coast is too long for strawberries.

The strawberry crop of Tennessee is usually harvested and distributed at the same time with the Ozark crop, but the Ozark berries have met and overcome this competition by superior quality.

The distribution of the Ozark strawberry crop in 1913 and of the output of the Ozark Fruit Growers' Association in

1912 according to the population of the cities taking one car or more was as follows:

TABLE NO. 13

| <u>Population of Cities</u> | 1913 Cars | 1912 Cars | Percent of Whole | |
|-----------------------------|--------------|--------------|------------------|------|
| | | | 1913 | 1912 |
| Less than 25,000 | 128 | 48 | 19 | 8 |
| Between 25,000 & 50,000 | 133 | 118 | 20 | 18 |
| Between 50,000 & 100,000 | 46 | 77 | 7 | 12 |
| Over 100,000 | 349 | 383 | 54 | 61 |

The popular supposition is that the larger cities having a wealthy class of people take most of the strawberry crop, but an analysis of the distribution as given in the above table shows that cities of 25,000 population or less took 19 per cent of the crop in 1913, and 8 per cent in 1912.

There were only three towns of less than 8,000 population that took cars direct in 1913.

TABLE NO. 14

| <u>Town</u> | <u>Population</u> | <u>Cars</u> |
|-----------------------|-------------------|-------------|
| Albert Lee, Minnesota | 6192 | 5 |
| Oelwein, Iowa | 6028 | 3 |
| Concordia, Kansas | 4415 | 2 |

The fact that towns as small as the above handled cars directly from the growers, indicates that there is a large number of small towns which, in a bumper year, could be induced to handle

strawberries in car lots. So far in the history of the marketing of the Ozark strawberry crop there has not been a time when the season's supply was greater than the demand.

SUMMARY.

First. The strawberry industry has added to the wealth of the Ozark region more than \$500,000 per year for each of the past ten years, or a total of more than \$5,000,000 in ten years.

Second. Strawberry growing has yielded profits of \$100 to \$200 per acre in some instances, while in others there has been an actual loss.

Many factors influence the profits in strawberry growing. Among these are soil, climate, distance from shipping point, varieties, preparation of the soil, methods of cultivation, picking, grading and packing, style of package used, and finally the methods of distribution.

Third. The Aroma variety meets the requirements of the markets and is adapted to South Missouri conditions. The Klondyke meets the requirements of the market and is adapted to Arkansas conditions. The Gandy variety meets the demands of the grower and the shipper as a late season berry for South Missouri and North Arkansas.

Fourth. Strawberries in the Ozarks of Missouri and Arkansas should be picked when three-fourths to fully colored, and with a stem one-half to three-fourths inch long in order to meet transportation and market requirements.

Fifth. The tin grading scoop introduced by the Peirce City, Missouri, Association is practicable and should

be adopted by every strawberry shipping association in the Ozarks.

Sixth. The American Ventilated crate containing twenty-four dry measure quart cups, is the best package for use in shipping the Ozark strawberry crop and should be used uniformly through the Ozarks because:

(a) It meets the legal requirements of every market in the United States.

(b) It is so constructed that thorough ventilation is obtained at all times.

(c) Other things being equal, it delivers the strawberries in better condition than any other style of crate.

(d) It is preferred by seventy-five per cent of the market-men.

Seventh. Inspection at the local loading sheds should be entirely in the hands of the central distributing association in order to maintain a standard of grades.

Eighth. At least three standard grades should be established.

Ninth. The facilities for proper distribution offered by the central affiliated shipping associations are far better than it is possible for any one local association to obtain alone.

Tenth. The best method of distributing the strawberry crop is through a local shipping association which is a member of some central distributing association.

APPENDIX.

A detailed description of types of strawberry packages follows:

The American Ventilated, or so-called Chattanooga, is a crate 11" x 11" x 24", somewhat similar to the six basket peach crate, holding three layers of eight quarts each. The cups are square with sides sloping gently from the bottom upward, thus distributing the weight of the berries over a larger surface. The cups have spaces in each corner to give a free circulation of air. Light wooden partitions are used between the bottom and middle layers, between the middle and top layers, and in some cases, between the top layer and the lid. This crate is composed of two pieces of paneled heads, 10" x 11", three pieces of lath $2\frac{1}{4}$ " x 24" and $\frac{3}{8}$ " thick for bottom, two pieces of sides $10\frac{1}{4}$ " x 24", one piece of top 11" x 24", and two partitions. The heads, top, sides and partitions are made up at the factory, but the crates are shipped in flat. The cups are nested when shipped, and are 5" x 5" x $2\frac{1}{2}$ ".

The Leslie Standard Crate holds two layers of 12 dry measure quarts each. There is a center piece dividing the crate into two parts, each part holding two layers of six quarts each. The quarts are octagonal in shape, being somewhat longer than broad, each cup containing 67.2 cubic inches. The quart is made of two pieces: a band $3\text{-}\frac{3}{8}$ " wide by $21\frac{3}{4}$ " long, with a bottom piece which is $3\frac{1}{2}$ " x $7\text{-}\frac{1}{8}$ ", the bottom being put into

slits made in the sides, making a depth of $2\frac{3}{4}$ inches, holding a full quart. The cups are shipped in the flat and are made up at the place of delivery either by hand or by special machinery. The crate has two head pieces and a central division board of $7\frac{1}{4}$ " x $14\frac{3}{4}$ ", two pieces for cover $7\frac{1}{2}$ " x $23\frac{1}{2}$ ", two pieces for sides $6\frac{1}{2}$ " x $23\frac{1}{2}$ ", three pieces for bottom 4" x $23\frac{1}{2}$ ".

The Leslie Crate (wine measure) is similar to the larger Leslie crate in both shape of crate and cups, the only difference being in the smaller size of the former. It is made of two pieces of heads and one central dividing board 7" x 14", three pieces of lath 4" x 22" for bottom, two pieces 6" x 22" for sides, and two pieces $7\frac{1}{2}$ " x 22" for top. The band used in making the sides of the cup is $3\frac{1}{4}$ " wide by $20\text{-}\frac{3}{8}$ " long, and the bottom is $3\frac{1}{4}$ " wide by $6\frac{3}{4}$ " long, holding when made up, a wine measure quart of $57\frac{3}{4}$ cubic inches.

The Leslie Crate is also made up for pint size cups.

The St. Louis Crate has two layers of 12 quarts each, and is made up of the following pieces: three head pieces, two side pieces, three bottom pieces, one solid top of two pieces nailed together. The outside dimensions for the St. Louis crate (wine measure) are 22" x $17\frac{1}{2}$ " x $7\text{-}\frac{3}{16}$ "; for the St. Louis Crate (dry measure), $22\frac{1}{2}$ " x $17\frac{1}{2}$ " x $7\text{-}\frac{5}{8}$ ".

The Illinois Hallock Crate uses a square cup. The crate holds 24 quarts, which are 5 inches square, $2\frac{1}{2}$ " deep. It is composed of three pieces of heading $6\frac{3}{4}$ " x $15\text{-}\frac{3}{8}$ ", three pieces of lath 4" x 22" for bottom, two pieces 6" x 22" for

sides, and two pieces 8" x 22" for top. There are no associations in the Ozark region using this kind of crate, and in this study no consideration has been given to this type.

There is also a sixteen quart crate which is not in use at any point in the Ozarks, but which is made up similar to the Leslie crate, of two layers of eight quarts each, using the American ventilated style of cup, which is 5" x 5" x $2\frac{3}{4}$ "

Copy of Laws Regulating Packages in
Iowa, Nebraska, Wisconsin and Minnesota.

Iowa. All sales of blueberries, blackberries, cranberries, currants, gooseberries, raspberries, cherries, strawberries and similar berries, also onion sets in packages of one peck or less, may be sold by the quart, pint, or half-pint, dry measure. And all berry boxes sold, used or offered for sale in this state, shall be of an interior capacity of not less than one quart, pint or half-pint dry measure. Any berry box or measure not conforming to these requirements shall be confiscated by the inspector. The above provisions became applicable October 1, 1913. All dry commodities weighing 10 ounces or more, except drugs, section comb honey, and berries as last above stated, shall be bought or sold only by standard weight or numerical count, lineal measure or surface measure, except where the parties otherwise agree in writing. Under the rulings of the dairy and food commissioner, a standard apple box shall represent a quantity of 2073.5 cubic inches, the same to be $10\frac{1}{2} \times 11\frac{1}{2} \times 18$ inches and the standard grape basket to be recognized as such by the dairy and food commissioner shall be of a size or capacity to contain four, eight and twenty pounds. The standard size for all boxes used in packing hops shall be $36 \times 18 \times 23\frac{1}{4}$ inches inside measurement.

Nebraska. All dry commodities not otherwise specified by law shall be sold only by standard dry measure, standard weight, or numerical count, except where the parties otherwise agree. Berries and small fruits whenever sold in boxes shall be sold in boxes containing a standard dry quart or dry pint or such packages must be labeled with the statement of the net contents, provided, however, that this provision does not apply to produce sold of the season of the crop of 1913.

Wisconsin. A bushel, truck measure, shall contain 2150.42 cubic inches. The half bushel and the parts thereof shall correspond in capacity to that of the bushel and shall be the standard measure for fruits, vegetables and other dry commodities customarily sold by heap measure. A bushel crate of cranberries, or blueberries shall have an interior capacity of one bushel struck measure. All sales of blackberries, blueberries, currants, gooseberries, raspberries, cherries, strawberries, and similar berries in quantities of less than one bushel shall be by the quart, pint, or half-pint dry measure, and all berry boxes or baskets sold, used, or offered for sale within the state shall be of the interior capacity of not less than one quart, pint, or half-pint dry measure. The standard crate, box, or basket for apples, pears, plums, peaches and other fruits, potatoes and other vegetables not secondarily contained in quart or other boxes shall have an interior capacity of not less than 2352 cubic inches. This is a standard crate and is legally salable as such. The capacity of the standard

crate is equivalent to one-third of the standard barrel of apples, pears and other fruits, potatoes and other vegetables. A variation of $1\frac{1}{2}$ per cent below will be allowed, but the variations should not be uniformly below in a test of twelve crates. The bushel crate for cranberries and blueberries shall hold 2150.42 cubic inches, struck measure. A variation of $1\frac{1}{2}$ per cent below or above is allowed but in no case should the variation be uniformly below in a test of twelve crates taken at random. Standard containers, other than the standard barrel, crate or basket, have the following capacities: two bushels, one bushel, one-half bushel, one-quarter peck, one quart, one pint, one-half pint. Variations allowed on these are as follows, above and below:

| | Cubic inches |
|---------------------------|--------------|
| 2 bushels - - - - - | 100 |
| 1 bushel - - - - - | 50 |
| $\frac{1}{2}$ " - - - - - | 30 |
| 1 peck - - - - - | 16 |
| $\frac{1}{2}$ " - - - - - | 10 |
| $\frac{1}{4}$ " - - - - - | 5 |
| 1 quart - - - - - | 3 |
| 1 pint - - - - - | 2 |
| $\frac{1}{2}$ " - - - - - | 1 |
| $\frac{1}{4}$ " - - - - - | .5 |

In no case should the variation be uniformly below in a test of twelve containers taken at random. The variations

above named for the quart and under shall be above only.

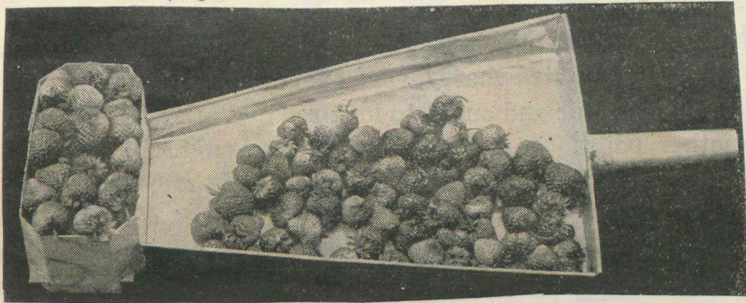
Minnesota. It shall be unlawful for any person to sell, offer for sale, or give away, any container for the distribution of berries or small fruit in less quantities than one bushel, unless said containers are of the capacity of one quart, one pint and one-half pint, or multiples of a quart, standard dry measure, and all sales of blackberries, blueberries, currants, gooseberries, strawberries and similar berries, and all plums, cherries, and similar small fruits in less quantities than one bushel shall be dry measure or in containers as above specified. In no case shall said containers be re-filled or used in the sale of berries or small fruits of any kind whatsoever. No tolerances.



American Ventilated
or
Chataooga Crate



American Ventilated
or
Chatanooga Crate



Tin Strawberry Grading
Scoop of the type used
at Peirce City Mo.

(Courtesy Mo. State Board of Horticulture)

ACKNOWLEDGEMENTS.

I wish to express my sincere thanks for the helpful suggestions made by Dr. J. C. Whitten and Dr. W. L. Howard. Their interest in the investigation has been a source of much encouragement.

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UNIVERSITY OF MISSOURI
COLUMBIA

DEPARTMENT OF HORTICULTURE

May 14, 1915

Dean Walter Miller,
Columbia, Mo.

My dear Dean Miller:

I am submitting the thesis presented by Mr. A. P. Boles and which has been approved by this Department.

Mr. Boles has satisfied requirements as to the master's examination.

I have approved the thesis with the understanding that Mr. Boles is to furnish in proper form a duplicate of Table No. 10 to be inserted before the thesis is bound, as a substitute for the slightly soiled copy of this table which is hereby being submitted.

You will recollect that a year ago Mr. Boles had fulfilled all requirements for the master's degree except that his thesis was not finally accepted by this Department due to the fact that there were some imperfections in the arrangement of Mr. Boles' material.

In my judgment this thesis represents a commendable degree of effort and of ability. In its present form I think it fulfills our standards as a master's thesis. Mr. Boles has made patient and persistent effort to write up the material in proper form and I believe that he has put it in as good form as

is feasible to have done without eliminating from it the
personality of the author.

Very truly yours,

L. C. Whitten

University of Missouri - Columbia



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