FRUIT PRICES ON THE NEW YORK MARKET AND FACTORS WHICH MAY AFFECT THEM

A STATISTICAL STUDY OF THE NEW YORK FRUIT AUCTION

by

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I wish to acknowledge the great assistance given by members of the Horticulture Department, and in particular that of Professor Henry Hartman, in obtaining the original material and in organizing and conducting this study.

Elbert Edwin Reed
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INTRODUCTION

To all persons who have had any contact with or any occasion to study the fruit markets of large cities, it is apparent that with them, as with almost all large commodity markets, prices are affected by a multiplicity of factors. Sudden fluctuations in prices occur which seem to have no particular noticeable cause, but which affect very materially the gross receipts for large volumes of fruit. Not infrequently those fluctuations, when translated into the form of net receipts to the grower hundreds or even thousands of miles away, mark the difference between a substantial profit and a heavy net loss for much or all of his crop—the result of an entire year's efforts.

On the market where the transfer of fruits takes place entirely through private sale, these fluctuations can not be easily measured, and figures are not obtainable which make possible any extensive study of them. On the other hand, in a number of the largest cities there exist fruit auctions where the fruit received is sold on the auction block and records kept of all sales.
Principal amongst these fruit auctions is that in New York City, where, under the management of several independent auction companies, large volumes of citrus, deciduous, and other fruits have been sold daily for a considerable number of years, the sales taking place on the piers of some of the largest eastern railroad companies. The importance of this fruit auction and the reputation which it holds for serving the interests of the growers, as well as the variety of buyers who obtain their fruit there, is attested by the fact that the California Fruit Growers' Exchange markets its entire New York City offerings of citrus fruits through this agency.

Occasional studies have been made by private concerns of the price and volume trends of individual fruit varieties or species, but it is not known that any attempt has ever been made to coordinate these trends in a study of all of the important fruits at once in an effort to separate out of the complex factors which may work together and again may work against each other to affect prices of certain or all fruits those which exert the most powerful influence.

This study was begun with the idea of analyzing available statistics of average fruit prices of the different fruit species and varieties on the New York Fruit Auction in an effort to measure supposed influences, to
prove or disprove their effect, and to note any variations in these effects due to shifting seasons of the year, weather conditions, etc. Such a study as that which is herewith presented must of necessity be only a small fraction of a more comprehensive and much longer study if definite trends are to be observed and defined and made available for guiding the economic practices of marketing. For that reason, any apparent findings of this particular report must be subject to complete revision after future studies covering a longer period of time and perhaps a still wider scope.

Year by year the competition between different fruits on the markets becomes more keen and the need for scientific market studies more necessary if losses are to be avoided and large and increasing volumes of fruit marketed at prices which will net a fair profit to the grower and at the same time be sufficiently low to meet public demands under average business conditions. Every bit of knowledge which may contribute toward the understanding of those principles of marketing which may be used to bring about such a condition will have much permanent value.

**PLAN OF INVESTIGATION**

Auction sales are held in New York City every day except Saturdays, Sundays, and holidays, though occasionally
Saturday sales are held. The results of these sales are published in the "New York Daily Fruit Reporter," which has a main printed edition with the details of all citrus sales and the general summaries of deciduous fruit sales and a mimeographed edition containing the itemized account of all sales of deciduous fruits.

Along with the itemized account of sales is given weighted average price by variety, grade, species, etc., according to the fruit. That gives, for instance, the average price paid for all extra fancy Delicious apples sold on a given day, or for all California oranges, or Florida grapefruit. If not given already, these average prices were computed.

In order to simplify this study and level off the effect of quality variations as much as possible, it was decided to get these figures onto a weekly basis instead of daily, where with comparatively small volumes of fruit it was noticed that price variations were very high, due apparently to differences in quality of fruit. To do this, the daily average prices were tabulated and the weighted averages for the week computed.

In computing prices only the highest grade is taken into account where grade separations are made. Apple and pear prices, for instance, are based almost entirely on "Extra Fancy" grade. That could not be done in all cases,
however, as certain districts market only combination grades and no separation could be made. California pears are all marketed in one grade, while Oregon and Washington pears are largely separated into two grades or more. Montana McIntosh apples are sold as a combination pack, while most Washington and Oregon apples are again separated into grades. In the case of one pear variety, the volume of "Extra Fancy" grade was too small and fluctuating to take as a standard and the "Fancy" grade was used instead.

In view of this situation, the price averages used are taken, not as a means of comparing their inter-relation as to district or variety, but rather to analyze the possible causes of their fluctuations.

The figures compiled gave the following weekly totals and averages:

1. Total gross sales of all fruits by carload.
2. Total gross sales by species of fruit in boxes, cases, or lugs.
3. Total sales by variety.
4. Average price by species, variety, or grade, according to the fruit.

In the case of fruits, such as plums and grapes, which are marketed in various types of packages, all were reduced to one common unit, that most used, in accordance with their approximate net weights, and their prices also adjusted in accordance. The same thing was done with pears marketed in 1/2 boxes.
From these tables graphs were made in which the movements of volumes and prices were all plotted for comparison.

The copies of the "New York Daily Fruit Reporter" available for this study covered 52 weekly periods, starting with October 3, 1932, and ending September 29, 1933. The term of an entire year's sales was covered in that way, though in some cases it touched portions of two years' crops. Due to the many crops covered and the different seasons of each, plus the effect of cold storage in carrying two deciduous fruits throughout the entire year, no other starting point for the year could be selected which would prevent such over-lapping of crops.

The weekly average temperature for New York City was obtained from the Weekly Weather and Crop Bulletin. As the weeks upon which these figures are based started and ended in the middle of the calendar week, some slight adjustments were necessary in order to more accurately measure their relation to average weekly fruit prices.

Assuming that prices would vary normally in inverse ratio to the fluctuations in volume, price curves have been plotted inverted. Thus, under such an assumption, the curves of volume and price should run parallel.

Two curves, those of "Volume of All Fruits" and of "Temperature," are plotted on all of the graphs of volumes
and prices. In order to avoid the confusion of large numbers of figures on all of the graphs, the index values of these curves are to be found only on Graph No. IV, that for oranges.

**TOTAL CARLOAD SALES**

In order to compare the quantities of the different fruits which were sold throughout the entire year, figures were compiled which show the number of carloads of each fruit sold over periods of four weeks each and for the entire year. The carload sales seemed the most accurate method of reducing the large assortment of packages and weights of the different fruits to a common denominator. As a considerable quantity of fruit is listed under the term "parts of carload," the figures as to total carload sales of necessity are only approximately correct, though any variation will be so small as to be of no significance in this study. The rank in sales for the entire year is shown in Table No. 1.
Table No. 1

| 1. Oranges | 18,476 carloads | 44.8% |
| 2. Grapefruit | 5,574 | 13.5% |
| 3. Apples | 3,842 | 9.3% |
| 4. Pears | 3,498 | 8.5% |
| 5. Grapes | 3,456 | 8.4% |
| 6. Lemons | 2,329 | 5.6% |
| 7. Plums | 1,677 | 4.6% |
| 8. Cherries | 730 | 1.8% |
| 9. Pineapples | 591 | 1.4% |
| 10. Peaches and Nectarines | 372 | .9% |
| 11. Apricots | 191 | .8% |

Miscellaneous | 500 |
TOTAL | 41,236 |

Thus 63.9% or, roughly, 2/3 of the fruit sold on the auction market during that year was citrus fruit, the remainder being distributed amongst all of the deciduous fruits, olives, pineapples, etc. As it is known that all, or practically all, of the packed citrus fruit which is sold in New York City is handled through the Fruit Auction but that a large volume of deciduous fruit, especially that from east of the Rocky Mountains, is sold through commission houses or privately, these figures do not reflect the true relative importance of these fruits on the entire New York
TOTAL CARLOAD SALES ON NEW YORK FRUIT AUCTION
BY FOUR-WEEK PERIODS

GRAPH NO. 1

- ORANGES
- GRAPEFRUIT
- LEMONS
- APPLES
- PEARS
- GRAPES
- PLUMS
- CHERRIES
- PEACHES + NECTARINES
- PINEAPPLES
- ASSORTED
fruit market. For the same reason there have undoubtedly been some price fluctuations the explanation of which would be found entirely outside of the Fruit Auction, and thus outside of the scope of this study.

Despite the fact just cited, the comparison of the volumes of the different fruits sold on the Auction is of great importance to the growers of the main fruit regions of the Pacific Coast and of Florida, a considerable percentage of whose fruit finds itself in open competition on that Auction.

Graph I is made to show the relative importance of the different fruits at different periods throughout the year. The following salient facts may be clearly seen from this graph:

1. Taken as a whole, the gross volume of fruit sales maintains a surprisingly even level throughout the year. At no time can it be said that there is anything even approaching a lack of fruit on the market. A weekly average of 800 cars of fruit is maintained with very little fluctuation through the entire year. That such a situation has been produced within the confines of one great nation with only very slight help from its island dependents seems almost incredible.

2. Five species of fruits produced within the United States and its island dependents may be obtained on
the New York market during the entire year. These five are oranges, grapefruit, lemons, apples, and pears. Of the five, all maintained from sources within continental U.S.A., though a considerable quantity of grapefruit from Porto Rico and the Isle of Pines is sold in the months of August and September.

3. The one fruit which dominates the market to by far the greatest extent is the orange, of which immense volumes are sold during every month of the year. So large is the volume of oranges sold and so dominating in its influence over the total volume of fruit handled that the smoothed curves of the two follow almost completely parallel lines. Periodic fluctuations in the volume of oranges sold are mirrored in the fluctuations in the volume of all fruits. These fluctuations in orange volume produced four peaks of almost identical height and separated by equal periods of approximately two months. As no study has been made as to the cause of these peaks, no explanation is given here for their occurrence. The sharpest peak, both as regards oranges and all fruits, was produced toward the middle of December. That was brought about by the holiday trade, undoubtedly, and was followed by an acute decline of sales. Both the increase in volume and the following decrease in volume were accompanied by the expected price drop, followed by a rise, which made the curve of volume
run parallel to the inverted curve of prices.

Between the peaks of orange volume of early June and early December is a steady decline, which reaches the bottom in September and October, followed by a steady climb to the new peak. Grapefruit follow a similar curve, though reaching their lowest point earlier in the summer, due largely to the fact that during the months of August and September arrivals from Porto Rico and the Isle of Pines swelled the total sales of that fruit.

This depression in orange and grapefruit volume, and a similar slack in the apple volume from June till September, is taken up by an increase in other fruits sufficient to maintain a more or less steady total volume of all fruits. Pineapples, cherries, plums, peaches and nectarines, pears, and grapes follow in succession and dove-tail together in such a way as to stabilize the total volume till the arrival of new heavy shipping of oranges, grapefruit and apples in the late fall months, which reach their peak with the holiday trade of December.

In the following Table No. 2 is given a comparison of the number of times that the volume curve of each species followed the volume curve of all fruits. This table is figured on the basis of weekly sales.
Table No. 2

<table>
<thead>
<tr>
<th>Fruit</th>
<th>No. Times Follows Vo. Curve All Fruits</th>
<th>%</th>
<th>Rank</th>
<th>Rank Total Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oranges</td>
<td>51</td>
<td>43</td>
<td>84.3</td>
<td>1</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>51</td>
<td>39</td>
<td>76.4</td>
<td>2</td>
</tr>
<tr>
<td>Apples</td>
<td>51</td>
<td>36</td>
<td>70.6</td>
<td>3</td>
</tr>
<tr>
<td>Cherries</td>
<td>13</td>
<td>8</td>
<td>61.5</td>
<td>4</td>
</tr>
<tr>
<td>Lemons</td>
<td>51</td>
<td>30</td>
<td>58.8</td>
<td>5</td>
</tr>
<tr>
<td>Pears</td>
<td>51</td>
<td>28</td>
<td>54.9</td>
<td>6</td>
</tr>
<tr>
<td>Grapes</td>
<td>34</td>
<td>18</td>
<td>52.9</td>
<td>7</td>
</tr>
<tr>
<td>Plums</td>
<td>22</td>
<td>11</td>
<td>50.0</td>
<td>8</td>
</tr>
<tr>
<td>Peaches &amp;</td>
<td></td>
<td></td>
<td>42.8</td>
<td>9</td>
</tr>
<tr>
<td>Nectarines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From this table may be seen clearly the fact that in general volume curve of all fruits is built up out of the volume curves of the most important species, with oranges, grapefruit, and apples occupying the places of greatest influence. Pears fall to sixth place despite the fact that in total volume they rank fourth. That is easily accounted for by the fact that though pears are marketed through the entire year, the largest volume is concentrated within the short period of three months, starting with the middle of July, during which period practically all of the immense Bartlett crop is marketed. During that period the curves run in opposite directions.
It was observed during the study that especially in the case of apples and pears there seemed to be a volume of sales on Monday entirely out of proportion with the rest of the week. To see whether the figures would bear out the observation, a check was made, with the results noted in Table No. 3.

Table No. 3

<table>
<thead>
<tr>
<th></th>
<th>Monday Sales Carloads</th>
<th>Yearly Sales Carloads</th>
<th>% of Sales on Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oranges</td>
<td>4,917</td>
<td>18,476</td>
<td>26.6%</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>1,445</td>
<td>5,574</td>
<td>25.9%</td>
</tr>
<tr>
<td>Lemons</td>
<td>752</td>
<td>2,329</td>
<td>32.3%</td>
</tr>
<tr>
<td>Apples</td>
<td>1,335</td>
<td>3,842</td>
<td>34.7%</td>
</tr>
<tr>
<td>Pears</td>
<td>1,178</td>
<td>3,498</td>
<td>33.6%</td>
</tr>
<tr>
<td>Grapes</td>
<td>1,092</td>
<td>3,456</td>
<td>31.6%</td>
</tr>
<tr>
<td>Plums</td>
<td>424</td>
<td>1,677</td>
<td>25.3%</td>
</tr>
</tbody>
</table>

The percentages resulting from this study seem to classify the fruits into two groups, one in which the Monday sales total in round numbers one-fourth of the sales for the week, and another group in which the Monday sales total one-third of the weekly sales. In the former group fall the oranges, grapefruit, and plums. In the second group go the lemons, apples, pears, and grapes.

Inferring that one might expect to find a less
stable price situation in the case of the fruits of which Monday sales were especially large, Table No. 4 was consulted to see which of the fruits showed the greatest tendency to sell at prices which bear a direct relation to the volume curves for those same fruits as compared with the volume curves of other fruits.

This study places oranges, grapefruits and plums in the class in which the prices for the species follow the volume curve for that species very definitely closer than the volume curves of other species or of all fruits. Grapes occupy an intermediary position, their prices following grape volume very definitely closer than the volume of any other fruit, but a small fraction below that of all fruits. Lemons, apples, and pears, on the other hand, show no tendency for their prices to follow their own volume fluctuations more than those of other species, and in all three cases follow more closely the volume of all fruits than that of their species.

While much further study would be required to bring definite light on this line, it seems to be entirely possible that such a relation as that suggested does exist and that the influence of heavy Monday sales to the extent of reaching one-third of the weekly volume may be an important factor in producing abnormal price fluctuations which result in a disorganized market situation.
THE RELATION TO PRICE FLUCTUATIONS TO FACTORS WHICH MAY CAUSE THEM

The number of factors which may influence fruit prices in the market is very large and their inter-relation so complex as to make an accurate measurement of their relative importance very difficult, if not impossible. At one time one factor may dominate and be the determining influence causing a shift in volume of sales and in the prices paid. Another time an entirely different factor may operate. And again several factors may work together in causing fluctuations.

The factors whose influence might be expected to be greatest are listed as follows:

1. Quality of the fruit sold.
2. Volume of fruit according to variety, species, and the total volume of all fruits sold.
3. The price at which other fruits are sold.
4. Weather conditions.

Some of these factors are impossible to measure numerically and for that reason are not included in this study. Amongst these is to be classed QUALITY, for which there seems to be no numerical standard. No market report can carry more differentiation between the quality of different lots of fruit than that implied by the separation into grades which took place in the packing shed, days or
weeks or months previous and usually thousands of miles away. Yet the variation between prices paid for different lots of fruit of a given variety and grade and even of a given brand are so great as to have formed the definite impression from the study of the year's market fluctuations that unquestionably the greatest factor of all in its influence upon fruit prices is the QUALITY of the fruit sold.

Fluctuations in price caused apparently by changes in the volume of fruit offered were daily occurrences and observed and measured continually. But those price fluctuations were as a rule comparatively small. In large lots of fruit the average daily fluctuation would seldom be above 10% of the sale price. On the other hand the difference between the ten highest and the ten lowest priced lots of a fruit of a given variety and grade and on the same day were so great that frequently one was nearly double the other. Out of such great fluctuations is built the average price used in this study. And due to those great fluctuations caused by differences in quality of the fruit, no study of this kind can accurately interpret influences unless made to cover large volumes of fruit over long periods of time.

Frequent cases might be cited in which with a comparatively small volume of sales the prices used in this study
fell instead of rising as the decrease in volume gave reason to expect. A brief study of the individual sales often showed that certain large lots of Extra Fancy fruit sold that day brought exceedingly low prices, often well below the prices paid for Fancy fruit of other brands. On several occasions this even brought the average price for all Extra Fancy fruit below that for the presumably lower Fancy grade. This influence is strongest at the start and close of the season for a given fruit or variety and accounts for the "jumpiness" which the price curves frequently show at the ends when the amount of fruit offered is much lower than in mid-season and the percentage of off-quality fruit larger, due to immaturity, lack of color, or spoilage. That factor more than any other probably accounts for the fact that the large majority of the percentages given to show how often the inverted price curves followed the volume curves fall within the ranges of 40 to 60% where one might expect much higher figures.

The factors which have been studied numerically and whose influence is measured here are the following:

1. The relation of the volume of all fruits sold to the prices paid for different species of fruits and varieties within the species.

2. The relation of the volume of fruit of one species to the prices paid for another.

3. The relation of the volume of fruit of a given species to the prices paid for that
species and for its most important varieties.

4. The relation of the volume of fruit of a variety within a species to the prices paid for that variety.

5. The relation between the prices paid for one species of fruit to those paid for another.

6. The relation between temperature fluctuations and price changes.

In order to get these factors onto a percentage basis it was decided to measure them qualitatively, disregarding entirely their quantitative influence. If the price rose $0.01 it was given the same value as a rise of $1.00. The same was done with fluctuations in volume. Though this does not reflect the total effect of a given situation, over a long period a more or less clear picture is developed as to whether a given influence has generally produced a rise or a fall in price, or whether no influence is apparent. Thus value is given only to a rise or a fall in price or in volume or in temperature and calculation is made of the number of times that prices conformed to the following EXPECTED CORRELATIONS:

1. A rise in volume is accompanied by a fall in price or a fall in volume is accompanied by a rise in price.

2. A rise in price of one fruit is accompanied by a rise in price of another, or a fall in price is accompanied by a fall.

3. A rise in temperature is accompanied by a rise in price, or a fall in temperature is accompanied by a fall in price.
Table No. 4

Percentages indicating how often inverted curve of fruit prices followed Influence Factor

<table>
<thead>
<tr>
<th>VOLUME OF</th>
<th>Grapefruit</th>
<th>Oranges</th>
<th>Lemons</th>
<th>Apples</th>
<th>Pears</th>
<th>Grapes</th>
<th>Plums</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fruits</td>
<td>58.8</td>
<td>43.1</td>
<td>52.9</td>
<td>53.5</td>
<td>53.6</td>
<td>63.6</td>
<td>42.9</td>
</tr>
<tr>
<td>Oranges</td>
<td>66.6</td>
<td>49.0</td>
<td>51.0</td>
<td>52.6</td>
<td>54.0</td>
<td>57.0</td>
<td>48.6</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>52.9</td>
<td>52.9</td>
<td>49.0</td>
<td>51.8</td>
<td>54.4</td>
<td>58.1</td>
<td>37.1</td>
</tr>
<tr>
<td>Lemons</td>
<td>49.0</td>
<td>41.2</td>
<td>45.1</td>
<td>38.4</td>
<td>42.1</td>
<td>48.4</td>
<td>52.9</td>
</tr>
<tr>
<td>Apples</td>
<td>56.8</td>
<td>31.4</td>
<td>51.0</td>
<td>50.6</td>
<td>48.5</td>
<td>59.1</td>
<td>48.6</td>
</tr>
<tr>
<td>Pears</td>
<td>37.2</td>
<td>41.2</td>
<td>51.0</td>
<td>49.4</td>
<td>50.6</td>
<td>44.1</td>
<td>50.0</td>
</tr>
<tr>
<td>Grapes</td>
<td>38.2</td>
<td>44.1</td>
<td>47.0</td>
<td>48.5</td>
<td>51.8</td>
<td>63.4</td>
<td>47.7</td>
</tr>
<tr>
<td>Plums</td>
<td>50.0</td>
<td>36.4</td>
<td>45.4</td>
<td>33.3</td>
<td>41.2</td>
<td>54.8</td>
<td>61.4</td>
</tr>
<tr>
<td>Cherries</td>
<td>50.0</td>
<td>35.7</td>
<td>38.4</td>
<td>31.8</td>
<td>42.1</td>
<td>44.4</td>
<td>53.5</td>
</tr>
<tr>
<td>Peaches &amp; Nectarines</td>
<td>53.8</td>
<td>69.2</td>
<td>50.0</td>
<td>37.1</td>
<td>34.8</td>
<td>48.0</td>
<td>54.7</td>
</tr>
</tbody>
</table>

Variety within species

| Oranges | 57.1 | 53.2 | 65.6 | 61.4 |
| Grapefruit | 51.0 | 49.0 | 50.6 | 57.4 |
| Lemons | 64.6 | 51.0 | 50.6 | 65.5 |
| Apples | 50.2 | 51.0 | 42.6 | 61.5 |
| Pears | 57.4 | 47.7 | 65.5 | 63.2 |
| Grapes | 55.9 | 58.1 | 50.0 | 66.7 |
| Plums | 57.1 | 52.9 | 58.6 | 63.2 |

TIME TEMPERATURE | 41.2 | 37.2 | 45.1 | 53.5 | 50.4 | 41.9 | 42.9 |
## Graph No. II

<table>
<thead>
<tr>
<th>Weeks</th>
<th>RISG and Prices</th>
<th>Vol. All Fruits</th>
<th>Oranges</th>
<th>Grapefruit</th>
<th>Lemons</th>
<th>Apples</th>
<th>Pears</th>
<th>Grapes</th>
<th>Plums</th>
<th>Cherries</th>
<th>Peaches Mediterranean</th>
</tr>
</thead>
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</table>

### Prices
- **Oranges**
- **Grapefruit**
- **Lemons**
- **Apples**
- **Pears**
- **Grapes**
- **Plums**
- **Cherries**
- **Peaches Mediterranean**

### Temperature
- **General Trend**
- **Pear Portlet (Calif)**
- **Clovis (Calif)**
- **W. Nellis (Calif)**
- **Green**
- **Washington**
- **Bass (Calif)**
- **Green**
- **Anjou (Green)**
- **Lester (Calif)**
- **Flemish (Wash)**
- **General Trend**
- **Grapes Seedless**
- **Empress**
- **Malaga**
- **Tahiti**
- **Ripal**
- **Carrington**
- **General Trend**
- **Plums Leche Italian**
- **General Plum Trend**

**Legend:**
- (+) Increase
- (-) Decrease
- (0) No change

**Note:**
- Small signs in graph represent significant changes in volume and price trends.
These rises and falls of prices, volumes and temperatures are charted in Graph No. II. Following that, and using this same table as a basis, a tabulation was made of the number of times that prices actually followed the EXPECTED CORRELATION and these reduced to a percentage basis. Thus, if the prices of a given fruit rose or fell with the corresponding fall and rise in the volume of that fruit sold on 34 occasions out of the 51 possible changes during the year and failed to do so 17 times, that factor would be rated as 67%. Table No. 4 gives the percentages resulting from that calculation.

A study of Table No. 4 brings out very clearly the following facts as regards volume influences:

1. The prices for the varieties of apples and grapes studied follow more closely their own variety volume curve than any of the other volume curves. In the case of plums the percentage is the same as for the species volume, but much above that of any other volume curve. With pears, the percentages for grapefruit, oranges, and all fruit volume curves are very slightly higher than pear variety volume.

2. In the cases of oranges, grapefruit and plums, the species volume follows the price curve much more closely than the volume curves of all fruits or for any other
one species. Exception is taken here in the case of grapefruits to the volume curve of peaches and nectarines, which were sold over such a short period of time and in such small quantities as to lead one to the opinion that the high percentage found in that case was the result of mere coincidence.

With grapes the percentage is a small fraction below that of the curve for all fruits but definitely higher than any other species curve.

On the other hand, lemons, apples, and pears show less tendency to follow their own species volume curve than to follow the volume curve for all fruits.

From the same table the following tendencies may be recognised as regards the influence of prices of one fruit upon another:

1. Taken as a whole the percentages run considerably higher than in the case of the volume curves, indicating an interdependence in prices between the different fruits which is of greater influence on these prices than the effect of shifting volumes.

2. There is a strong parallel noticeable between the prices of lemons and oranges and almost no discernible parallel between either of those fruits and grapefruits.

3. As a group, parallel between prices is to be found amongst the fruits with a definite seasonal limit—
grapes, plums, and pears. It is here inferred that the pears are limited to the early pears, particularly the Bartlett, as none of the late pears are to be found on the market at the same time with grapes and plums. This is somewhat of a surprise in view of the fact that in the case of plums their peak volume has been reached by the time the pears and grapes are getting started.

Here again, the seasonal character of the grapes sets a definite parallel between grape prices and apple prices to the extent of 65.5%. As with pears, this of necessity refers to early season apples, though less limited as to variety than is the case with pears.

The strong parallel between the prices for plums, grapes and early apples and pears (all run over 60%) would seem to establish them definitely as competing fruits.

In regard to temperature influences, no definite inferences have been drawn from the figures compiled. Oranges, grapefruit, grapes, and plums show a clear tendency for prices to fall with rising temperature and rise with falling temperature. But other factors are discernible as being possibly the true causes rather than temperature fluctuations. In the case of grapes and plums, for instance, the sales extend far into the fall with decreasing volumes which run parallel to the continual
decrease in temperature and undoubtedly account largely for the increase in price to a large extent. One would expect with lemon a regular increase of price to accompany the increase in temperature, and vice versa. That actually did take place to some extent, but the influence was again over-shadowed by volume fluctuations. Evidence is apparent that the market was underfed during some period of falling temperature, as in the holiday season, resulting in a rise instead of a fall in price. Again, over-feeding the market in the summer brought a sharp decline over a considerable period following a previous rise which accompanied the rise in temperature of spring and summer.

In the case of apples and pears, the fall in prices with decreasing temperatures and rise with increasing temperatures again found a parallel with the curve of total volume increases and decreases which undoubtedly were the influencing factors.

Table No. 5

In order to weigh the sum total effect of the different Influencing Factors, the percentages for each were averaged with the following results:
<table>
<thead>
<tr>
<th>Influencing Factor</th>
<th>VOLUME OF Variety within species</th>
<th>Ave. %</th>
<th>Rank</th>
<th>Rank in Volume</th>
<th>Rank in Volume Influence</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>59.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species</td>
<td>55.8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Oranges</td>
<td>54.1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>All fruits</td>
<td>52.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grapefruit</td>
<td>51.2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Peaches and Nectarines</td>
<td>49.7</td>
<td>3</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Apples</td>
<td>49.4</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Grapes</td>
<td>48.7</td>
<td>5</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Pears</td>
<td>46.2</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Plums</td>
<td>46.1</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Lemons</td>
<td>45.3</td>
<td>8</td>
<td>6</td>
<td>5</td>
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<tr>
<td></td>
<td>Cherries</td>
<td>45.1</td>
<td>9</td>
<td>9</td>
<td>4</td>
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<tr>
<td>PRICES OF</td>
<td>Grapes</td>
<td>58.8</td>
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<td></td>
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<tr>
<td></td>
<td>Plums</td>
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<td>56.0</td>
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<td>Pears</td>
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<tr>
<td></td>
<td>Apples</td>
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<td>Lemons</td>
<td>52.6</td>
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<tr>
<td></td>
<td>Grapefruit</td>
<td>51.6</td>
<td>7</td>
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<td></td>
</tr>
<tr>
<td>TEMPERATURE</td>
<td></td>
<td>55.4</td>
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</tbody>
</table>
The average percentages given in Table No. 6 serve to emphasize tendencies already mentioned, especially the strong influence of the variety volume within the species upon its own prices; the influence of the species volume; and the stronger correlation between prices of one species with those of others than between volumes of one species and prices of others.

Another important fact is brought out in Table No. 5. Assuming that the average percentages obtained are a faithful indication of the comparative influence of the volumes of these different fruit species upon general fruit prices, we find that they rank in practically the same order of importance as they rank in order of total yearly volume sold on the market. If we eliminate the seasonal fruits and take only those which go through the entire year—oranges, grapefruit, apples, pears, and lemons—we find that those five principal fruits maintain exactly the same order in both cases.

In regard to the averaged percentages of parallel price fluctuations, there seems to be a clash between the two strong influences already noted. On the whole the price influence of seasonal fruits is the stronger influence, followed by the price influence of oranges, the heaviest in volume of any of the fruits. Here the year-round fruits occupy a different order from that observed
in measuring the relation of volumes to prices. Grapefruits drop to last place instead of second, and pears climb somewhat. That was to be expected, however, for the seasonal character of the heaviest pear sales again works to increase its influence above the influence of volume alone.

**THE INFLUENCE OF VARIETY VOLUME UPON ITS PRICE**

As has been already pointed out, this is probably the strongest influence regulating prices outside of that all-important factor of Quality. A study of the graphs leads one to the opinion that that is especially the case during mid-season when the largest volume of a given variety is being sold, which in the long run is far more important in determining the average seasonal price than high prices for small quantities of fruit at both ends of the season.

In the case of apples, for instance, and it is reflected in more or less the same way with most of the other fruits, the prices of early season varieties and late varieties are high and during those periods tend to follow the species volume curve rather than the variety curve, unless those two curves happen to run together where the market is left with only one or two varieties of apples.
The elimination of these off-season prices and the "jumpy" prices which characterize many of the varieties at the start and end of their own particular season would only serve to further emphasize the importance of the volume of a given variety in determining its price during the main season of sale.

This strong correlation between the volume of a given variety and the price which it brings on the Auction is a factor of vital importance to the grower, who on the average seems a bit reluctant to recognize the fact that different varieties within a species often follow different trade channels on their way to the ultimate consumer and that different varieties are frequently used for different purposes and even sold to very different classes of customers. Thus many varieties are not replaceable by others.

The result of such trade preferences is that though the sale price of a given variety may follow the influence of the species volume for a period, an acute increase or decrease in the offerings of that one particular variety may throw its market completely off balance till the volume again reaches an approximately normal state.

As illustration of that point may be cited the case of the Rome Beauty apple, which goes through its own special trade channels and under normal conditions sells at moderate
prices—considerably below the main dessert apples, such as Delicious and Yellow Newtown. Nevertheless, a sharp decline in the volume of sales of that variety starting February 6th continued for a period of about two weeks and was accompanied by an extraordinary increase in prices, selling for the entire period at prices far above those of any of the other varieties which previously and subsequently sold at much higher prices than the Rome Beauty.

One of the most striking examples of the stabilizing effect of a regular volume of fruit offered for sale over a long period of time is to be seen in the Graph No. X of McIntosh apples from Montana. The total volume sold is not large, but it was fed to the market in such even quantities and over such a long period as to give the most regular curve for volume and price of any fruit unit touched in this study. The curve of Montana McIntosh prices ran parallel with total McIntosh volume 60% of the time as compared with the average of 57.1% for all apple varieties.

ORANGES

It has been stated already that the manner in which the different fruits have dove-tailed together to maintain an approximately level volume of sales throughout the year is truly surprising.
GRAPH NO. III

ORANGES
VOLUME OF SALES BY MONTH
AND BY SOURCE OF FRUIT
1932 1933
OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY AUG SEPT

THOUSANDS
OF CASES

-700
-600
-500
-400
-300
-200
-100
0

Fla. & Other
CALIF
Graph No. III shows how this same situation has been built up with oranges to only a slightly lesser degree. Seasonal and regional production has become so spread out that with such adjustment as only cooperative marketing efforts can obtain, the gross volume of oranges marketed through the Fruit Auction has held very closely to two approximate period levels. For seven months, from December to June, inclusive, the volume hardly varied from 750,000 cases per month except for the month of April, where they dropped to 650,000. Through the summer months an average slightly below 500,000 cases was maintained, followed in November by the climb to the winter and spring level.

That such a situation was developed in the face of varying varieties and seasons and volumes shipped from the different producing regions, mainly California and Florida, is all the more to be admired. The Graph shows very clearly how the two districts worked together to maintain a uniform volume on the market. That the California production contributed more to that end is to be observed from the fact that her marketing was spread over the entire twelve months of the year, against only nine for Florida.

A study of Graphs Nos. III and IV shows how the marketing policies of the California producers work to
their advantage as far as price is concerned, for their fruit was on the market in smallest volume during the period of low prices and climbed to its peak during the period of highest prices.

Not only was the above true, but it was also noted that there was on the average a price differential of about $0.40 per case in favor of the California orange when the same varieties were brought into direct competition from the two producing areas. Arizona oranges, which were sold in small volume, brought a still higher price.

Such can not be interpreted as evidence of a greater return for the grower, however, due to the much greater freight haul from California than from Florida, making more careful handling and closer grading a necessity if California fruit is to compete with that from Florida on the same market and still leave sufficient balance to pay producing costs with a small margin of profit.

On the whole the curve of orange volume and the inverted curve of orange price follow a distinct parallel from one end of the year to the other. Many fluctuations are to be noticed in both volume and price, but they do not greatly alter the general volume and price trends. Two distinct peaks in volume are to be seen, and both are followed by sharp declines in volume. The first peak came just before the Christmas holiday and can be attributed to
GRAPEFRUIT
VOLUME OF SALES BY MONTH
AND BY SOURCE OF FRUIT

1932 1933
OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY AUG SEPT

THOUSANDS
OF CASES

-250

-200

-150

-100

-50

50

CALIF.
TEXAS
PORTO
RICO
ISLE
PINES
F.L.A.
that fact. The other peak came in the month of June and coincides with a sharp rise in temperature. It may have been a mere coincidence, but sharp fluctuations in temperature during the last weeks of May and the first weeks of June were reflected by exactly similar fluctuations in volume of orange sales. Prices also followed the same curve four weeks out of the five. A similar situation was observed with lemons, as well as with some varieties of deciduous fruits. If the same tendency were to be noted in successive years, it would bear out the assumption that the abrupt temperature changes which are normal for that period of late spring and which are usually very severely felt are actually strong factors in determining market demands. At no other period of the year was there any evidence of such strong influence.

**GRAPEFRUIT**

Graph No. V showing the region of production of the grapefruit sold on the auction gives a clear picture of the distribution throughout the year as well. Here Florida occupies the dominant position, providing grapefruit during all twelve months, though in no great volume during the months of August, September, and October. California markets in negligible quantities, and Porto Rico and the Isle of Pines make fairly heavy shipments in September and October, when they obtain high off-season prices. Sales
reached the yearly peak in April and May.

Graph No. VI gives the curves of price, volume and temperature. Fluctuations in volume of grapefruit were sharper than the price fluctuations, which were in reality very small. But both curves follow a very parallel general course throughout the year. The only slight variation from that rule occurs in late May and June, when volume starts a decline which is not reflected by prices till about a month later. In the case of grapefruit volume price and temperature do not follow the same curve during the last weeks of May and first of June, as observed with oranges and lemons.

**LEMONS**

As all of the lemons produced in U.S.A. and sold on the Fruit Auction came from California and those from Sicily were sold at separate sale, no comparison is made between them.

Graph No. VII is one of the most irregular of all the graphs made, yet one of the most interesting in the study of the causes of fluctuations in prices. Here can be observed in one single graph the effects of heavy unloading, of lack of fruit at periods when heavy consumption might be expected, of uniform sales during long periods, and of conflict between temperature and volume as dominating factors on price during the months of late spring and
Starting with October, the volume of sales increase to a high peak just before Thanksgiving time. Evidently sales exceeded demand, for prices fell sharply and continued to fall for several weeks even though sales dropped heavily. Instead of the increase in sales which the approach of the Christmas holiday season might have been expected to have brought, sales continued to run almost level till along into the month of January. As a consequence, prices took a great jump, indicating clearly a scarcity of lemons on the market for the holiday trade. Then, after the holidays were a thing of the past, a heavy flow of lemons reached the market all of a sudden, and though the flow decreased steadily for several weeks, it was well above market needs and had the effect of continuing to depress the prices till sales reached an approximate pre-Christmas level. From then on and for almost four months volumes of sales and prices followed almost parallel lines and an even level.

With the coming of the month of May and warmer temperatures both prices and volumes took a very sharp jump, both continuing to rise almost steadily with the general rise in temperature, till the latter part of June. At this point temperature takes a drop for a period of over a month, and in the face of large volumes of sales
APPLES

VOLUME OF SALES BY FOUR-WEEK PERIODS AND BY VARIETY
the price drops heavily. Even a great decrease in volume did not stay that fall till a new period of high temperatures intervened and prices again rose even with the highest volume peak of the year. Immediately after these peak sales and higher prices, temperature takes another drop and decreased sales fail to take up the slack sufficient to prevent a substantial fall in prices.

The situation pictured shows clearly the need of exceedingly careful marketing studies with such a fruit as the lemon if excessive price fluctuations are to be prevented and a more or less stable situation developed. A greater control of shipments might be obtained at certain periods of the year, but it would seem that the only way of handling the difficult situation caused by fluctuating temperatures and volumes, especially in summer season, would be through maintaining large storage facilities at marketing points, making it possible to feed the demands of a daily changing market.

APPLES

Graphs Nos. VIII and IX show the relative importance of different apple varieties and regions as regards the total volume of sales. The order of total sales of the varieties is shown in the following table.
Table No. 6

1. Delicious  - 995,252 boxes
2. Winesap   - 471,475
3. Rome      - 417,692
4. Newtown   - 242,642
5. Spitsenbourg - 161,360
6. McIntosh  - 157,054
7. Jonathan  - 88,512
8. Gravenstein - 82,837

Other varieties bring the total to 2,626,709 boxes.

However, these figures do not indicate as clearly as does the graph the dominating influence of the Delicious over the whole apple market from the start of the fall apple season till about the first of April, during which period it over-shadowed completely all other varieties.

Starting about the beginning of April, the volume of Winesaps and Newtowns began to climb at a rate which offset the decline of the Delicious which began about the same time, thus maintaining a more or less even volume and even price for all apples.

About the first of May the Winesaps and Newtowns passed by the Delicious in importance and for the rest of the season these two varieties comprised the large bulk of the sales. However, a considerable quantity of Delicious continued to be sold all the way to June 1st and even
beyond, obtaining a continually decreasing price in contrast with the steadily increasing price of the other two varieties, particularly the Newtown.

In regard to producing region, the vast majority of the apples came from Washington.

On the whole, the smoothed curves of price and volume of all apple varieties run parallel, and until about April 1st the smoothed curve of the volume by variety follows those curves in a general way, but on arrival of the month of April those curves break up and follow one of two strong tendencies:

1. The sharp decline of general apple volume greatly overshadows the increase in volume of Winesap and Newtown varieties and produces a dominating influence over the prices for those varieties which is far stronger than the increase in their volume of sales.

2. Two varieties, the Delicious and Winesap, show the effect of carrying the sale of a given variety on beyond their normal market period. After the end of April the Delicious sold at steadily decreasing prices, and after July 1st the Winesap also suffered a continuous decline. How much of that decline was due to a decrease in quality and how much to changing weather conditions or competition from fresh fruits, it is impossible to say definitely, but the contrast between these declines and the rapid
GRAPH NO. XIV

PEARS

VOLUME OF SALES BY FOUR-WEEK PERIODS
AND BY SOURCE OF FRUIT

WASHINGTON
OREGON

IDAHO & COLO.

WASHINGTON
OREGON

CALIF.

THOUSANDS OF BOXES

320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20

NOV.
DEC.
JAN.
FEB.
MAR.
APR.
MAY
JUN.
JUL.
AUG.
SEPT.
improvement in price of the Newtown, which has superior keeping qualities, gives reason to believe that the decline in prices for the Delicious and Winesap was due to their having been held for sale beyond the period in which their quality and flavor made them readily salable at good prices.

PEARS

Graph No. XIV shows the distribution by states of the pears sold on the fruit auction, and Graph No. XIII shows the distribution by variety. On these graphs may be seen plainly the important place in the pear trade occupied by Bartlett shipments from California, as has already been mentioned. Total shipments by variety and by state are shown in the following table.

Table No. 7

<table>
<thead>
<tr>
<th></th>
<th>Calif.</th>
<th>Ore.</th>
<th>Wash.</th>
<th>Idaho</th>
<th>Colo.</th>
<th>Total</th>
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<tr>
<td>Bartlett</td>
<td>710,620</td>
<td>105,514</td>
<td>26,377</td>
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<td>842,511</td>
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<td>Anjou</td>
<td>22,412</td>
<td>310,132</td>
<td>106,867</td>
<td>2,952</td>
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<td>Bosc</td>
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<td>23,964</td>
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<td>Winter</td>
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<tr>
<td>Helen</td>
<td>37,550</td>
<td>60,051</td>
<td>33,846</td>
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<td>131,702</td>
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<td>42,556</td>
<td>355</td>
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<td>116,777</td>
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<td>1,849</td>
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<td>22,002</td>
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<td>Mercia</td>
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<td>Clairgeau</td>
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<tr>
<td>Assorted</td>
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<td>4,421</td>
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<td>22,601</td>
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<tr>
<td>Total Boxes</td>
<td>1,010,508</td>
<td>719,516</td>
<td>216,774</td>
<td>3,227</td>
<td>13,969</td>
<td>1,963,978</td>
</tr>
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</table>
Once the California Bartletts are off the market, the trade is soon dominated by Oregon Boscs and Anjous. A comparatively small volume of Winter Nelis through the last half of the Anjou season, and California Easters end up the shipping season.

Of all the fruits studied, pears show the least tendency to follow any correlation between prices and the influencing factors which are given consideration here. For instance, the sudden arrival of immense amounts of Bartlett pears is accompanied by extremely high prices which maintain over a considerable period. Once the Bartlett season passes, the arrival of other varieties is not sufficient to prevent a fairly rapid fall in total volume of pears. Yet during that period of falling volume, especially up to the month of January, all pear prices, with the exception of Oregon Anjous, suffer a steady fall. In very few cases do the curves of volume and price maintain themselves even approximately level. The closest that we find to parallel curves takes place with Oregon Anjous and Winter Nelis and California Easter.

**GRAPEs**

All of the grapes listed in the sales on the Fruit Auction came from California. By variety their distribution was as follows:
There is a great difference between varieties in the tendency for their prices to follow the curve of variety or species volume. In the case of Seedless, for instance, all three curves run more or less parallel, due perhaps to the dominating influence of Seedless volume on total volume. Tokay also shows the same strong tendency, and Ribier to a lesser extent.

On the other hand, the remaining varieties, Emperor, Malaga, and Cornichon show comparatively little tendency to follow any parallel except occasionally for short periods.

This division of varieties might be made on the basis of season. The first three named are the earliest and in general their prices fall with the rapid rise of species
GRAPH NO. XXI

PLUMS AND FRESH PRUNES
Weekly Sales and Prices

Thousands of Crates

Prices

1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00

Oct. 1 Nov.

Volume All Fruits
Volume All Plums & Prunes
Temperature
Volume Formosa
Price Formosa
Volume Trajedy
Price Trajedy
Volume Kelsey
Price Kelsey
Volume Nectarines
Price Nectarines
and varietal volume at the start of the season and rise again as the peak is passed and the species and varietal volumes decrease. The other three varieties were very irregular in every way, but especially toward the end of the season showed a marked tendency to be affected by the volume of all fruits. With greatly diminished grape volume all showed almost more tendency to fall in price and run parallel with the rise in volume of all fruits. These three varieties, particularly the Cornichon and the Malaga, carry the lowest general price level of any of the main grape varieties. That may indicate a reluctance on the part of the market to accept these varieties, at least in the large volume in which they are sold, obliging them to accept the general market fluctuations rather than establish their own place on the market.

PLUMS

A glance at Graphs Nos. XX and XXXI convinces one immediately of the extreme complexity of the factors which cause fluctuations in prices. In the plum we have a fruit which is highly seasonal. Not only that, but it is, as a species, composed of a large number of varieties, each with its own very restricted marketing period. Again, as has already been suggested, the period when plums are on the market is a period of seasonal fruit, with the total volume of each shifting rapidly from nothing to a high peak and
back to nothing again. They also come at a period of high temperatures and sharp fluctuations between moderate and high temperatures, factors of particular importance with fruits of comparatively poor keeping qualities, once they are placed on the retail market.

One striking feature of plum prices was the fact that each new variety of the ten studied started its own particular season with comparatively high prices and fell rapidly as it developed greater volume. The only exception to that rule came in the case of nectarines, which hit the market at a period of almost universally increasing plum prices along with the decrease in volume which followed directly after reaching the season's peak. Yet the Kelsey and President, which started within two weeks after the start of the nectarine, showed marked tendencies to fall during the first weeks of sale.

In the case of the earliest plums, Beauty and Formosa, the strong tendency to follow the curve of species volume was particularly noticeable, and only slightly less so with the Santa Rosa, which also fell sharply in price with increasing volume of all plum varieties and failed to reflect the fall in its own volume till the total plum volume also started downward. So it can be said that these early varieties were really dominated, as regards price, by the total volume of plum sales.
The mid-season varieties, Wickson and Trajedy, followed the total plum curve both in the curves of their volumes and prices, only varying from that rule in 3 out of 28 chances. These two varieties started arriving just previous to the peak of plum sales and carried on for several weeks after total sales had fallen considerably.

Another jump in volume during the first days of September, when the Kelseys, Nectarines, and Presidents were falling off in volume and Oregon Italians coming on in considerable quantities, brought another slump in prices in the case of all those varieties with the exception of Kelsey. The season finished off with Oregon and Idaho Italians at prices showing a greater tendency to fall than rise.

Only once during the season did plum prices show any particular tendency to leave variety of species volume and follow the volume of all fruits. During the last half of June the volume of all fruits fell sharply as compared with a rapid rise in plum volume. As a result, the prices of the three varieties of plums on the market at that time, the Beauty, Formosa, and Santa Rosa, all either increased or their fall was noticeably diminished.

As far as temperature is concerned, there is no visible evidence of any correlation whatsoever. Peak sales happened to coincide with the period of most prolonged high
temperatures and lowest prices, thus producing the apparent
effect of prices that decrease with increase with rising
temperatures and increase with temperatures as they fall.
The fact that such an effect was not produced by the
fluctuations from week to week would seem to be full proof
that it is an apparent rather than a real effect and has
no significance.
SUMMARY

The total carload sales of fruits on the New York Fruit Auction maintains a surprisingly stable volume of fruit throughout the year, averaging about 800 carloads weekly. Two-thirds of these sales are of citrus fruits and nearly one-half are oranges.

The yearly total volume of Monday sales for lemons, apples, pears, and grapes was approximately one-third the total for all of the week. In the case of oranges, grapefruit, and plums, it reached only about one-fourth. This suggests the possible relation of this factor to the tendency in the latter group for prices to be closely related to the volume of sales of the species.

Though not made a part of this numerical study, the factor QUALITY is undoubtedly the greatest in its influence upon prices, even with fruit selected and packed in accordance with well-developed grading systems.

With some fruit species, particularly apples, and to only a slightly less extent with plums and grapes, prices follow fluctuations in volume of the variety more than any other influence studied. This is interpreted as indicative of special trade preferences and outlets for many of the main fruit varieties, and perhaps even for some not usually classified as important.
With oranges, grapefruit, and plums, prices follow species volume most closely.

On the whole, price changes tend to follow fluctuations in the prices of other fruits more closely than shifts in volume factors. This is particularly true with seasonal fruits, such as plums, grapes, and summer and fall pears and apples. This would seem to establish these as definitely competing fruits.

In gross sales, the five fruits which are marketed throughout the year rank as follows: oranges, grapefruit, apples, pears, and lemons. In average correlation between their volume fluctuations and the price fluctuations of individual fruit species, the same order is exactly maintained.

Feeding the market with steady volumes of Montana McIntosh over a long period of months resulted in the steadiest curves of both volumes and prices of any graphed, in this study, and in addition resulted in a higher-than-average correlation between volume and price fluctuations.

No particular relation between temperature changes and price fluctuations was to be noticed except during the period of late May and June when rapidly rising temperatures coupled with considerable fluctuation were reflected in volumes of sales and prices, volumes increasing even with increasing prices up to certain limits. This was limited
to oranges and lemons.

Orange prices followed orange volumes strongly. The control of California orange volume and quality was the major factor in producing a stable orange market, both as to volume and as to prices.

Grapefruit price and volume curves follow a general parallel throughout the year. Practically all of the production came from Florida, with fairly heavy shipments from Porto Rico and the Isle of Pines during September and October.

Lemon volumes and prices showed strong tendencies toward fluctuation, especially at the holiday times and during the summer. With the producing area thousands of miles away, it would seem recommendable that some storage facilities be provided near the market to make possible the adjustment of supply to demands during those periods, thus preventing such violent fluctuations in prices and volumes as were observed.

Mid-season varieties or sales show a greater tendency for prices to follow variety volume. Early and late season varieties or sales show a greater tendency for prices to follow species volume.

Some varieties show the strong tendency toward being held till too late in the season. Delicious, Winesap, and Spitzenburg apples declined in price during the closing
weeks of their sale, in the face of rising prices and falling volumes for other varieties.

No particular correlation between pear prices and any of the influencing factors was noticeable. That may be accounted for in part by the fact that pears are shown by this study to fall into two separate classifications—that of a seasonal fruit during the summer and early fall when Bartlett and a few other summer pears are on the market in immense volume, and that of a year-round fruit. Here different influences work against each other.

Seedless grapes occupied the dominating position with that species. The prices of the earlier grape varieties, Seedless, Tokay, and Ribier, fall with increasing volume and rise as their own volume decreases later. Later varieties, especially Malaga and Cornichon, show a tendency for prices to fall even with falling volume, and Emperor, latest of all, shows but slight tendency to rise in price.

Early plum variety prices are dominated by total plum volume. With mid-season varieties, prices, total plum volume and species volumes all maintain approximately parallel lines. With late plums, prices usually followed variety volume as the variety came on and species and variety volume as it went off. Oregon and Idaho fresh prunes fell in price with falling volume.