A STUDY OF THE FACTORS AFFECTING THE PURCHASING OF CITRUS FRUITS

Thesis for the Degree of M. S.
MICHIGAN STATE COLLEGE

Orpha M. Huffman

1939

THESIS

LIBRARY
Michigan State
University

A STUDY OF THE FACTORS AFFECTING THE PURCHASING OF CITRUS FRUITS

By

Orpha Mae Huffman

Submitted in partial fulfilment
of the requirement for the degree of
Master of Science

Department of Institution Administration

Division of Home Economics

Michigan State College

June - 1939

THESIS

ACKNOWLEDGMENT

The writer wishes to express her appreciation and thanks to all who assisted in making this study possible: particularly to Professor Mabelle S. Ehlers, under whose supervision the work was directed; to Dr. Marie Dye who rendered valuable assistance by her suggestive criticism; and to Dr. Ernest Bessey, Dr. W. L. Mallmann, Professor G. G. Speeker and Dr. W. D. Baten.

121486

TABLE OF CONTENTS

LIST OF GRAPHS

LIST OF TABLES

Tables		Page

LIST OF CHARTS

I. INTRODUCTION

A. Object of Study

Since Citrus Fruits from three widely separated regions are now found on the markets of the central states, it would be advantageous to learn whether any particular varieties are superior to others in any respect. To formulate buying guides for citrus fruits for institution marketing was the motive leading to this study. The investigation was conducted along four lines: (1) volumes, areas and seasons of production of citrus fruits, (2) methods of distribution and resulting consumption areas, (3) prices of citrus fruits and (4) comparison of qualities of these fruits.

B. Review of Literature

While a great deal of literature is available on the topic of citrus fruits, little has been interpreted so as to assist in formulating purchasing guides for the institution buyer.

The topic as studied by the United States Department of Agriculture, has dealt with the production, distribution and marketing angles of the problem. The consumer angle is not mentioned.

One phase of production studied extensively by the Department of Agriculture deals with genetics. In the "Yearbook of Agriculture 1937" (1) the report on "Improvement of Subtropical Fruit Crops: Citrus" was written by Hamilton Traub, Senior Horticulturist and T. Ralph Robinson, Senior Physiologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry.

This report contains an excellent discussion of types and varieties of fruits grown in various regions, as well as breeding methods and results.

The Federal Bureau of Agricultural Economics deals with the distribution of the fruits. The Division of Fruits and Vegetables in that bureau prepares statistical reports of "Carlot Shipments of Fruits and Vegetables" (2) and "Carlot Unloads of Certain fruits and Vegetables in 66 Cities and Imports in Four Cities for Canada" (3). These appear first, while some figures might still be incomplete, in mimeographed form, and as soon as possible after the close of the calendar year. Printed bulletins later combine the two above mentioned reports with data for two years included in one volume.

The series of Carlot Shipments (2) show each of the fruits and vegetables in separate tables, giving the state of origin of the cars and the months in which they were shipped. (Tables I to XXXVI) In the case of some states with widely differing climatic conditions, the state production is divided into regions; for example, California Northern District, Southern District, Central District and Imperial Valley. (Tables VII, VIII and others).

"Carlot Unloads" (3) gives the information for each of the important population centers in this country. The tables give the same two types of information; the origin of the fruit and the months of arrival.

The Farm Credit Administration has published a bulletin by Kelsey B. Gardner regarding "Terminal Fruit Auctions as Marketing Agencies for Farmers' Cooperatives". (4) The discussion therein proves the power of the organizations of cooperative associations in

the sale of produce, including citrus fruits, in which cooperatives were organized early and which practically control the industry.

From time to time there appear bulletins prepared by state agricultural experimental stations. These deal with management of orchards and problems of production, handling and marketing of the fruits. Florida State Marketing Bureau in cooperation with the United States Department of Agriculture has edited a bulletin, "Marketing Florida Citrus, Summary of 1937-1938 Season" by H. F. Willson (5). This is again statistical information regarding marketing of the fruits. The Department of Agriculture has also published "Citrus Growing in Florida" (6) with contributions by John M. Scott, R. H. Howard, Frank H. Scruggs and others. Phases of growing and marketing are discussed. Since the beginning of this study by the writer, a new bulletin has appeared. J. M. Thompson, former Assistant in Agriculture Extension in California wrote "The Orange Industry: An Economic Study" (7). This survey is written from the viewpoint of understanding the problems of production and marketing as they affect the producer.

While cooperative selling agencies have issued many circulars, in the main these were written for advertising purposes and hence the material therein is more or less biased. Much of this from the California Fruit Growers Exchange is an attempt to influence the public to use "Sunkist" fruits. Florida Citrus Exchange is also publishing literature of this nature. However, through its Statistical Department it has compiled "Auction Sales, 1937-1938" (8), "Statistical Bulletin" (9), and "Summary of Shipments" (10), which give authentic and unbiased information.

The abundance of statistical data is therefore evident. However,

There is little interpretation of that data as to its effect on the purchasing of citrus fruits. One study of this nature has been found. Oranges and grapefruit are included in foods examined by Olive Gertrude Wyse in "A Study of Consumers' Problems in the Selection of Certain Foodstuffs" (11).

C. The Present Status of Citrus Consumption.

It is obvious to any observer that increasing amounts of citrus fruits are appearing in the daily diet of people of all financial circumstances. No longer are oranges on the table a mark of wealth. It is taken for granted that citrus fruits contribute something of value to the winter diet in particular.

The last twenty years have found an enormous increase in the quantities of citrus products in the northern markets. Not only do local grocery stores handle the fruits, but rapidly increasing numbers of small markets are springing up for the sale of fresh vegetables and fruits only. There are even occasional stores which sell citrus fruits exclusively.

Several factors have contributed to this increased use of citrus fruits. The development of better keeping varieties makes long shipments possible; new and better methods of preservation extend the season; lower prices extend their uses. Advertising by producers and their agents has made the public "citrus conscious", while education along nutritional lines has emphasized the need for the citrus fruits from childhood to old age.

When it is found that a food seemingly so desirable and one which can be put to a variety of uses, is "good for one", and that the

price of that food is reasonable, its increased use is the logical result. Thus the use of citrus fruits in the institution menu has gradually extended from the first course of the breakfast meal through the final course of the evening meal.

D. History of the Citrus Industry.

1. Early History

The citrus fruits as a class are native to southeastern Asia--eastern India, Indo-China, southern China and the Philippines. As a group, these fruits have been cultivated for hundreds of years in the Orient. The earliest treatise on citrus culture which is still in existence, is a monograph on the oranges of Wenchow, Chekiang, Nan Yen-Chih's Chu Lu. This was composed during the period 1174-1189, in the Chinese language. That long ago three horticultural groups of oranges were recognized and the total varieties listed was twenty-seven. (1)

From the commercial standpoint, only five or six of the dozen or more types of citrus fruits are important. They include the following:

1. _Citrus sinensis_, the sweet orange
2. _Citrus maxima_, the grapefruit
3. _Citrus limonia_, the lemon
4. _Citrus aurantifolia_, the lime
5. _Citrus nobilis_, the Mandarin orange

Rootstocks are obtained from some other varieties, as:

1. _Citrus aurantium_, the sour orange
2. _Citrus limonia_, the rough lemon
3. _Poncirus trifoliata_, the trifoliolate orange

Along the trade routes from the Orient the various types and varieties spread to the other parts of the world. The orange received

mention in the Sanskrit. (12) At an early date the citron reached the Mediterranean region as mention of it appears in the writings of Theophrastus. (1)

The sweet orange reached this region later, apparently not until the early fifteenth century. The sour orange reached Spain by way of northern Africa. Ellen Ramsey (12) states that the sour orange was seen by the Crusaders growing in Palestine. In 1002 A. D. the Arabs took it to Sicily.

Traub and Robinson (1) say that the lemon and lime were introduced into Europe about the same time as the sweet orange, the fifteenth century. Several varieties of these are described by Ferrarius and other writers.

Lemon culture first became important in Sicily, Genoa, and other parts of southern Europe.

2. Introduction into Western Hemisphere.

On his second voyage to the New World in 1493, Columbus stopped off at Gomera, Grand Canary Island, for two days. He purchased livestock and fruit and vegetable seed, and among these, he is supposed to have obtained "seeds of oranges, lemons and citrons". On the island of Hispaniola, where he landed on November 22, 1493, he established a colony, where he "set out orchards, planted gardens". (1)

3. History in Florida.

Exhaustive studies have not been made of introductions to other parts of America. It is believed that citrus fruits were established at Saint Augustine, eastern Florida by 1579. In that state the sour orange, and to some extent the sweet orange and the lime, escaped into the wild to grow uncultivated. (1)

Citrus growing in Florida to any great extent dates back about two hundred years. In 1791, William Bartram wrote of his "Travels Through North and South Carolina, Georgia, East and West Florida". In accounts of his journeys through Florida in 1773, often he mentions the orange groves along the St. Johns River in the region where Jacksonville now stands, and as far south as DeLand. At another time his writings tell of passing orange groves on his trip from St. Johns to the Alachua savanna. (6) However, citrus growing in Florida did not reach proportions which could be called commercial until 1870. By the 1880's the industry had become fairly important. Two severe freezes in the winter of 1894-1895 practically wiped out that fruit growing in the northeastern part of the state, and the orange industry became centered in the central ridge section and the southern coastal area where it is located today. (1) Grapefruit suffered a setback at that same time, but has gradually recovered, reaching a peak in 1929. The lemon industry, which was of considerable importance commercially until the time of the freeze, has never been rebuilt, although there have been some recent attempts to reestablish it. (1)

4. History in California.

Citrus seeds were brought into Lower California probably in the early 1700's, from other parts of Mexico. In 1769 the Franciscan missionaries began establishing missions for four hundred miles along the coast of California. At these missions they set out various fruit trees, among them orange and citron cuttings. Early settlers obtained trees from these mission orchards, and by 1830 and 1840 there were a number of small plantings in the region of Los Angeles. About 1871 the section where Riverside now stands was sold to settlers by an eastern promoter, and numerous orchards were set. (13)

The source of the supply of many of the plantings of about this time was the nursery owned by Thomas A. Garey. He was the outstanding nurseryman of his time, and imported large numbers of important varieties from 1858 to 1875, apparently from Florida, Australia and southern Europe, as well as from the nurseries of Allwanger and Barry of Rochester, New York, and Sir Thomas Rivers of Sawbridgeworth, England. (1)

The fruit was sold locally until the completion of the Southern Pacific Railroad in 1876, when the first carload of fruit was shipped to St. Louis, Missouri, arriving in good condition following a month in transit. The first special train loaded entirely with oranges, left the River Station, Los Angeles, February 14, 1886 for the east via the Southern Pacific and Union Pacific Railroads.

Grapefruit growing in California and Arizona was started in 1890 with plantings of the Marsh variety. It has been important only locally, since the quality of these grapefruit is inferior so far, to that of the fruit grown in Texas and Florida. (1)

Lemon culture has been especially successful in California; the southern coastal region of this state produces most of this fruit found on our markets. (1)

5. History in Texas

The Rio Grande Valley citrus industry is a rather young enterprise. Its history can be divided into three distinct periods. (1) Up to 1899 citrus fruit was grown for home use, and no particular attention was paid to rootstock. (2) The resistance to frost was demonstrated during the freeze of 1899. Trees budded on trifoliate stock withstood this destruction, and therefore, this type was the popular supply of rootstock for the next decade. However, this stock was soon found to be subject to several diseases common to oranges. (3) Observations of some very outstanding pioneers in the Rio Grande Valley, beginning after 1900, made possible the growing of citrus there in commercial quantities. The sour-orange rootstock was found to be superior for the climatic conditions there. The importance of this development is clearly demonstrated by the fact that in 1921 the citrus shipments of this section amounted to thirteen carloads, and in 1931 had increased to five thousand carloads. These shipments consisted mainly of grapefruit of the Marsh variety and its pink-fleshed mutations. (1)

E. Species and Varieties of Citrus Fruits

1. Species of Citrus Fruits.

The genus Citrus includes many species in the Family Rutaceae, whose fleshy fruits are used chiefly for food. Closely related to the true Citrus species are the genera Fortunella, including the kumquats, and Poncirus, the Trifoliolate orange, as well as a few other tropical genera whose fruit never reach this region. (19)

The outstanding groups have been mentioned in connection with the history of the fruit. The Mandarin orange and the tangerine orange are forms of _Citrus nobilis_ variety _deliciosa_; and the Satsuma orange of _Citrus nobilis_ variety _unshiu_. _Citrus maxima_ has several members, the shaddock, the grapefruit and the pummelo (also spelled pomelo). Citron, _Citrus medica_ is not an important species, but is grown somewhat in this country. Of lesser importance are the species

of Fortunella, the kumquats. (19, 1)

The large number of types make possible fruit with many diversities-- in dessert and keeping qualities, season of maturity, resistance to disease, and regional adaptation.

2. Characteristics and Uses of the Fruits.

Many of the citrus fruits--sweet orange, grapefruit, lemon, and lime--are very well known even to the people in northern United States, and require but little description. The taste qualities are said to depend on various combinations of sugars, acids, glucosides, esters, and peel oil. The sugars and acids are the basic matrix, and give the variations from sour through tart, sweet and insipid. The esters, glucosides and peel oil account for the bitter and aromatic qualities. It seems that the bitter characteristic furnished by glucosides is in evidence only if these substances are present in sufficient amount in the tissue. This bitter taste is not **normally** present in oranges, but is an expected and even desired quality in grapefruit and lemons. This is proved by a prejudice against a variety of grapefruit called Triumph which does not have the characteristic glucoside bitterness of this type of citrus. Coit (13) describes this variety as "somewhat lacking in flavor". The aromatic quality furnished by the oil of the peel, is important in some species, such as <u>Citrus</u> nobilis. (1)

The sensation of sweetness predominates in most commercial varieties of the sweet orange. Analyses of California oranges reported in a bulletin from the University of California Agricultural Station, shows the sugar content of Washington Navel and Mediterranean Sweet oranges to be 9.92% and 9.70% respectively. (13) Of this approximately half is sucrose, and the remainder a mixture of other fruit sugars. A slight perceptible tartness is usually combined with the sweet flavor. Coit (13) attributes this to the citric acid content which is about 1%. The contribution of esters is only slight in most varieties, but in the "Pineapple" variety lends an outstanding characteristic odor.

In the Mandarin orange or the "kid glove" varieties, the esters give the tangerines a pleasant "tang". The King and Satsuma oranges in this group are sweet like the sweet orange.

The glucoside naringin gives the grapefruit the quality of bitterness. This, added to the acidity, which is at times mild, and at others more prominent, makes the fruit the outstanding breakfast or first course appetizer.

The term Shaddock or pomelo named after Captain Shaddock, who first brought it to the West Indies, is supposed to be native to the Malayan Islands. It is very large in size, sometimes attaining a diameter of nine inches and a weight of fifteen pounds. The skin is yellow; the rind thick, white, spongy and bitter; the pulp greenish, sub-acid, watery and aromatic. Fairchild in "The World Was My Garden" describes a pink fleshed Shaddock which he found in Java.

In this country a small variety, somewhat larger than a large orange, is the one seen on the market. This is the fruit called grapefruit from a habit of growing in clusters like bunches of grapes, or pomelo, leaving the name Shaddock for the larger sort, although strictly speaking all are pomelos. The grapefruit is rather thin-skinned for its size, but the toughness of its skin renders it a good shipper, and preserves the juice for a long time, often till far into the summer. The tree is productive, yielding as much as sixteen barrels from a tree twenty-five years old. (22)

The acidity is the first importance in limes and lemons. Traub and Robinson think that the acid content should be 6% to 7% in these fruits. (1) Coit (13) says the lemons contain 7½% of citric acid and 2% total sugars, of which ½ of 1% is cane sugar. The characteristic glucoside accounts for the distinguishing flavor of limes. The peel oil in both fruits contributes desirable qualities. (1)

Citron is used entirely for making preserves or for candied citron used in fruit cakes, plum puddings and products of that nature. The kumquat is used in preserving, for table decorations on twigs which are grown as ornamentals on lawns in California, and as a fruit to be consumed fresh, in which case the whole, including the skin is eaten. Sweet and sour varieties are known, and in each the rind has little of the pungent oil which is found in most citrus fruits. (1,13)

3. Varieties of Oranges.

Varieties of the various types are closely linked with the region in which they are grown. Therefore, they will be discussed in groups corresponding to the regions of citrus culture.

(a) Florida Oranges.

The sweet oranges of Florida consist of mainly five varieties; the Hamlin, and Parson Brown which are early; the Pineapple and Homosassa which are mid-season crops; and one late variety, the Valencia.

Hamlin, a sport of the Mediterranean orange, was discovered in a grove planted by Isaac Stone, near Glenwood, Florida in 1879 for Mrs. Mary H. Payne. This grove later came into the possession of A. G. Hamlin and the orange was then named for him. It is an early orange of remarkably fine quality. (15) When conditions for culture are favorable, the acidity and sweetness are well blended, resulting in excellent flavor. The rind is the smoothest of any of the sweet varieties, and is glossy; seeds contained usually number one to five, with many fruits seedless; sections 11-12, uneven in size. Unfavorable growing conditions give rise to fruit splitting, riciness of pulp, and poor juice quality, so the quality of Hamlin is not always satisfactory. (1)

The Parson Brown is an orange of Spanish origin. This variety originated about the same time as the Hamlin variety. According to F. D. Waite, it was introduced by Captain J. L. Carney of Lake Weir, Florida, about 1878, and originated at Webster in the seedling grove of Parson Brown. (15) In this variety also, the acidity and sweetness are fairly well blended, if the fruit is picked early. Seeds number from ten to nineteen; sections 16, regular, well defined. (1) It is thought by some to be of better quality than Hamlin from Sweetness standpoint.

The Homosassa, another Spanish type, is a variety of excellent quality, with a rich flavor. Rind is thick, tough and smooth. Seeds in this kind number up around twenty to twenty-four. Sections number eleven, large, and fairly regular; flesh is coarse-grained. The acidity and sweetness is well blended. This variety is one of the best of the Florida seedlings. According to Reasoner, it originated in the grove of the Honorable Mr. Yulee at Homosassa, Florida. (15)

The Pineapple, is an outstanding variety. It has a glossy, smooth, bright and satiny rind of deep orange color, full ripe specimens often showing a reddish tinge. Sections number eleven, slightly irregular; seeds are abundant, usually thirteen to twenty-three. It originated in the heart of the old citrus belt near Citra, Marion County, Florida, in the grove of James B. Owens. It was named Pineapple because of its fancied resemblance in flavor to this fruit, and from the odor which is similar to that of pineapple, in the opinion of some. The fruit belongs to the Mediterranean type. (15)

The Valencia orange is outstanding because of its late maturity. The Mediterranean type also claims this variety. The flesh is firm; the rind is thin, smooth, tough; sections are nine or more in number, and are clearly marked. (15) It has a fairly high content of citric acid which contributes to its good holding and shipping quality. (1) It is regarded as seedless, but actually has from two to six seeds. The Valencia orange was introduced through the Thomas Rivers' Nurseries, London, England, into Florida and California nearly the same time. The Rivers' nurseries had imported it from the Azores, and had catalogued it "Excelsior". It was introduced into Florida seemingly in two different plantings, about 1870 by General Sanford, Palatka, and shortly afterward by E. H. Hart, Federal Point. It is sometimes referred to as Hart's Late orange, Hart's Tardiff, or Hart. However, in recent years the term Valencia is commercially applied.

In the markets of the middle west a variety known as Indian River is seen only rarely. It is a native seedling variety, originating on the Indian River in Florida; hence its name. The quality is excellent, juice abundant, flavor rich and sprightly.

(b) California Oranges

Two varieties prove sufficient to furnish California with an orange crop every month of the year. And so the number of varieties there are limited to these plantings of any great size.

The Washington Navel, Bahia or Riverside Navel is of great commercial importance. The best strain of this variety is described by Shammel and associates as "obovoid in shape, and generally of medium to large size. The rind is of medium thickness, and the texture is smooth grained. The color of the fruit is bright orange; the rag is tender and comparatively small in quantity; the juice is abundant and of superior quality; having a pleasing and sprightly subacid flavor. The fruits are seedless, and the navel usually is small, rudimentary, with no development except in the rind." (16) This variety was introduced into California in 1873. In 1870 William Saunders, then in charge of government propagating at Washington, District of Columbia, for the United States Agricultural Department, received a shipment from a missionary at Bahia, Brazil, containing twelve trees of the Bahia Navel orange. After being placed in the greenhouse at Washington, these trees were used indiscriminately as a source of buds from which were propagated a number of trees. Hume (15) thinks two of these twelve trees imported were received by Mrs. Luther (Eliza) Tibbets, of Riverside California. Coit (13) believes all these twelve original trees for some reason passed out of existence, and that the trees received by Mrs. Tibbets were two propagated from the originals in the greenhouses at Washington. In either case, the two trees were planted beside the cottage of the Tibbets family in Riverside on land which they were homesteading. In 1879, at the Citrus Fair in Riverside, fruits of the trees of Mrs. Tibbets were displayed and received considerable attention. It was thought that Mrs. Tibbets forgot the name Bahia, and upon questioning answered that the oranges were from Washington. Thus the name came to be Washington Navel, and all other Navels were called Australian because it was supposed that they all came from Australia. (13)

The Valencia is the other principal variety of sweet orange grown in California. Climatic conditions vary widely because of differences in rainfall, protection by mountain ranges, the moderating influence of the ocean and other factors. These affect the ripening period of fruit, so that the same variety matures at different times in different regions. This, linked with "tree-storage" in the case of Valencias, which holds its fruit in good condition for several months, causes a marketable fruit crop throughout the year. This tree storage is made possible by the dry summer climate with comparative freedom from fruit-destroying fungi, together with other seasonal factors assisting in a long ripening season. This type of storage is used to a lesser extent in Florida. One disadvantage is that the oranges become less juicy during such storage. Although this is the same variety of orange grown in Florida, there is some difference in the flavor, texture, etc., due to different soil, and different climatic conditions.

Some other varieties are grown in lesser amounts in California. These include Australian, Mediterranean Sweet, Paper Rind, Ruby (Blood), Jaffa, Joppa and Crafton, none of these being of commercial importance in California. (13)

(c) Texas Oranges.

The oranges grown in Texas consist of varieties already mentioned, the Hamlin, Pineapple, Parson Brown and a few additional varieties as the Joppa and Ruby. However, in general none of these are well adapted to the climatic conditions of Texas. The Valencia trees are productive and fairly regular in bearing, but the fruit is undersized. (1)

The Temple orange, the exact origin of which is unknown, is promising under Texas conditions. It is thought to be a hybrid between a sweet orange and some variety of the Mandarin group. The original tree from which propagation was started is budded, but no one knows where the bud came from. (15) It stands in old Temple place, near Winter Park, Florida, and was named for William Chase Temple. The Buckeye Nurseries, Tampa Florida catalogued it in 1917.

4. Varieties of Grapefruit.

(a) The important varieties of grapefruit which are grown in Florida consist of two kinds, the Duncan and the Marsh. The Duncan is a very superior variety, but has many seeds, sometimes as many as fifty. (15) Sections number fourteen, well marked. The large juice sacs make it possible to remove the pulp from the sections. It originated as a seedling from a tree grown by Don Phillippe, in Pinellas County, Florida. (15) The original tree nearly one hundred years old was standing yet in 1925. This variety of fruit can be held on the trees, and is picked from November to April. However, the seeds often germinate after March, and the fruit is not as desirable.

The Marsh variety, because of its seedlessness is gradually replacing many of the seedy varieties. Although called seedless, the seeds number from none up to six. The rind varies in thickness and is smooth. The sections are thirteen, regular, and have thin partitions. The bitter principal is not strongly marked. This variety was introduced by C. M. Marsh, Lakeland, Florida, about 1895. The absence of seeds makes it possible to hold this fruit on the trees in "tree storage" very late. They mature late in the fall or in early winter.

McCarty or Indian River is an interesting variety. Its fruiting habit is different, as it bears its fruit singly on the branches. It is seedy, containing forty to sixty seeds; acidity is normal. Sections total thirteen and are large, rather irregular. The origin of the variety is unknown, according to Hume (15). The man for whom it was named, C. T. McCarty of Eldred, Florida, from whom specimens were first received, wrote regarding it; "This pomelo is known here as the Standard or Indian River; I don't know its origin. It came here from Rockledge sixteen years ago (about 1886)."

There are now pink-fleshed varieties being grown in Florida. Both are from Marsh variety parents. The Thompson (seedless), and also the Foster (seedy) are similar to the parent in characteristics except for the pink flesh. In both, this color tends to fade as the fruit reaches full maturity. (1). The former variety was discovered by S. A. Collins in a grove owned by W. B. Thompson, near Oneco, in 1913. The latter was found by I. B. Foster, of Manatee, Florida, in an Atwood grove at Manavista. In Foster, the color often shows through the rind, although actually the color is confined to the section membranes. (15).

A variety known as Davis is being grown and receiving attention, because of its outstanding characteristic, which is the fact that it has been satisfactory for canning. The pulp remains firm, while that of the Marsh tends to become soft in processing. (1).

(b) Texas Grapefruit.

The Marsh variety is the most abundant kind being grown in the Rio Grande Valley. This, as grown there, has "a pleasing, mild flavor that has met with favor in most markets where the fruits have been offered for sale." (17)

A number of early seedy varieties are grown to a lesser extent, but these disappear from the market after the seedless Marsh variety is on sale. These seedy fruits include Duncan, Conner, McCarty, Inman, and Walters. (1)

Both the Foster (seedy) and the Thompson (seedless) pink-fleshed varieties grown in Texas ripen early and sell at a premium. The Ruby, a newer type, a mutation from Thompson, has both pink flesh and pink rind. This should not be confused with the Ruby orange.

(c) California and Arizona Grapefruit.

The few grapefruit which are grown in this district are of the Marsh variety. They mature late in the fall or in early winter.

5. Varieties of Mandarin Oranges, Tangerines and Satsumas.

(a) Tangerines

(1) Florida tangerines are one variety, the Dancy. This variety is very prolific. The skin is deep orange in color and so is the flesh. The rind is smooth, thick, leathery, and easily removed from the rest, being attached by few strings to the flesh. Sections number eleven to fourteen, fairly regular in size, and are easily detached from one another. It is said to have originated as a seedling at Buena Vista, St. Johns County, Florida. The parent tree was raised by Colonel George L. Dancy. (15)

(2) Texas has the Dancy variety from its earlier plantings, but has later found the Clementine and the Warnuco superior under Rio Grande Valley conditions. (1)

(3) California Dancy tangerines are small in size. Therefore new varieties are being developed which produce fruits of good

size and excellent quality. Three of these developed by Frost of the Riverside Station are the Kara, the Kinnow and the Wilking. (1)

(b) Satsumas.

(1) The Satsuma industry of the Gulf coast region from Florida to eastern Texas is based primarily on the Owari Satsuma, as it is an early fruit. An earlier variety would be still more advantageous to this region, in order to get it on the market before the sweet orange arrives in large quantities. Therefore, newer varieties, as the Kawano and the Silverhill are being tested for this early development quality and for ability to resist cold. (1)

6. Varieties of Lemons.

(a) Florida Lemons.

Citrus scab has proved to be destructive to the lemon industry in Florida. Varieties to withstand this disease are desirable. The Perrine lemon has lately been introduced, and promises, because of its resistant qualities, to give new hope to the industry. So far it is not important commercially. (1)

The Meyer lemon is a variety noteworthy for its frost resistance. However, its low acid content, which is only 4.3% to 4.8%, large size, and round shape are all definite drawbacks on the commercial market. (1)

(b) California Lemons.

The present plantings of California lemons are limited to two varieties. The Eureka is desirable because of its comparative freedom from thorns, its earlier bearing quality, and its ability to produce large quantities of fruit. Its chief drawback is its characteristic of dropping leaves from the branches, leaving the fruit exposed to the hot rays of the sun. The color of the cured fruit is lemon-yellow. The rind is very thick when uncured, and reduces to 1/8 inch when cured. Sections number ten, and are well defined and regular. Juice is abundant; acid, pure and strong. Flavor is excellent; seeds are present, mostly abortive, small. This variety was introduced by T. A. Garey of Los Angeles and was originated by C. R. Workman at the same place, the seed from which it grew having been imported from Hamburg in 1872. (15).

The Lisbon is the other principal variety. It has heavy foliage which, in contrast to the Eureka, protects the fruit from sunburn. It has a tendency to bear one large crop, maturing in winter, with only a small amount of summer fruit. The color of the cured fruit is lemon-yellow and the base is somewhat necked. The rind is fairly smooth, and sweet to the taste. Sections total ten or eleven, and are regular in size. Juice is abundant and acid is clear, pure, strong, with an excellent flavor. Seeds number one to five, usually abortive. The fruit keeps well. The Lisbon lemon was imported from Portugal and was first grown at Riverside, California by D. N. Burnham.

7. Varieties of Limes.

The Key, Mexican or West Indian lime has been the principal variety of limes grown, and these mainly on the keys. In size and quality the fruit is very variable as it is grown from seeds, and accordingly it is thought that it is not any single well-marked variety.

Lately, the Tahiti (also called Persian or Bearss) variety is being planted on the main land in the southern ridge section. It

is of high quality, with a heavier skin that will permit storing and shipping, and it has a pleasant aromatic property. (1) The Lakeland and Eustis limes are excellent for juicing quality, but are small and lack the thick rind which is desirable for transportation. (1) Therefore, they are of local importance only.

8. Varieties of Minor Citrus Fruits.

(a) The citron varieties also are numerous, but here also one variety is important commercially, the Corsican. (1)

(b) Kumquats include the Nagami, oval variety, the Marumi, round and the Meiwa, a sweet variety. The first named predominates in all plantings thus far. Its rind is smooth, aromatic and spicy. The juice acid is sparse; sections usually number five. Seeds total two to five. (15)

(c) The sour orange, Oklawaka, is superior to other varieties. The fruits are larger, three or four inches in diameter. It is an excellent marmalade variety if one likes bitter orange marmalade of the English or Scotch type. (1).

II. METHODS USED IN STUDY

Several methods were used in making this study. Through statistics, a survey was made of the size of the industry, the production regions and distribution of the fruits. Prices of fruits secured on local markets gave insight into the types and sizes of fruits available. Laboratory study was used to ascertain relative qualities of fruits. Comparison was made with similar findings of other research workers.

A. Statistical Information

Statistics on citrus production were obtained from the United States Department of Agriculture through the Chicago office of the Bureau of Agricultural Economics. Reports from state agricultural stations and from marketing organizations listed volumes of production of the various varieties of fruits, prices of fruit on the Detroit and other auctions, and the sales of the fruit from week to week with the carlot unloads of fruit in each of the sixty-six principal cities in the United States. Bulletins published by Florida Agricultural Experimental Station, University of California and the United States Department of Agriculture gave information of production and distribution. (1, 2, 3, 5, 6, 7, 8, 9, 10, 17)

B. Prices.

As the packing and handling of the fruits affect both the price and quality of the fruits, these aspects of marketing were studied. Literature obtained from state bulletins and the bulletins from marketing agencies assisted in this phase of the work. Information regarding rots and fumigation methods were checked by Dr. W. L. Mallmann.*

Local retail stores were visited each Wednesday and Saturday for three months, January 28 to April 15, 1939. Varieties of stock on hand and the prices of these fruits were obtained. Wholesale prices were obtained from bulletins published by the marketing agencies. Freight rates were obtained from local freight agents.

*Dr. W. L. Mallmann is Associate Professor in the Bacteriology Department of Michigan State College, East Lansing, Michigan.

C. Qualities of Fruit.

Thirty dozen oranges of various varieties were purchased at various intervals from local retail stores and from the Detroit Union Terminal, a wholesale market. Determinations were made on the day of purchase or within three days after the purchase. During that time they were kept at ordinary room temperature.

Determinations were made on one dozen of each of the following varieties and sizes.

California Navels	Florida Valencias	Florida Pineapples
324	324	
288	288	
252	250	
216	216	
200	200	200
176	176	176
150	150	150
126	126	
100	100	
	96	

Florida Temples	Florida "Round"	Texas Navels
176	Not sized	Not sized
150		
126	Florida Valencias	
	U. S. #1	
	U. S. #2	
	U. S. #3	

Each orange was weighed to the nearest tenth of a gram on a trip balance which was balanced each day before use. The juice was extracted with the fruit juice extractor sold under the trade name "Sunkist", running at a high speed. The orange was held steadily on the reamer for the first five seconds and then turned several times to get the pressure distributed so that the juice would be extracted from all parts of the fruit. The extraction was stopped when no more juice could be expressed, and when further reaming would have caused the removal of undesirable membranes. This process required from ten to twenty-five seconds, according to the size of the orange. The strained and unstrained juices were measured in a graduate cylinder. The juices, both strained and unstrained were also weighed to the nearesttenth of a gram. These weights were used to determine the percentage of juice obtainable from each size, the amount of juice obtainable and the cost of juice from each size.

Ten dozen 150 California Navels and $7\frac{1}{2}$ dozen Florida Valencias, size 150, were weighed for correlation of size. The oranges were taken from one box in each case and weighed to the nearest gram. These were used to find mean weight and frequency of weights.

Three dozen Florida Valencias and three dozen California Navels were tested for effect of storage on loss of weight and effect on amount of juice obtainable. The oranges of one variety came from one box in each case. One dozen of each variety were juiced immediately, one dozen was placed in a refrigerator for one week at 40°- 50° F., and the third dozen sotred in a storeroom at 70°- 80°F. for the same length of time. Weights at purchase and when juiced were recorded. The amounts of juice in each case was found, and comparison made between the different conditions of holding.

Quality of the juice of different grades of Florida Valencia oranges was tested by having a group of judges give opinions as to the comparative sweetness and flavor of the juices.

A study was made of the ability of persons to determine the difference between lemon and lime juices when made into beverages. Judges attempted to name the juice from the flavor of the beverage.

Desirable concentrations of lime and lemon ades were rated by judges when beverages were made with constant amounts of water and sugar, and three different amounts of juice in the case of each fruit.

Judges rated the desirability of grapefruit sections from fruits from three states. Sections were tasted after removal from the fruit and without peel or membrane.

A survey of similar studies showed work by Olive Gertrude Wyse, University of Michigan Hospital and Greater New York Dietetics Association. Comparisons of results are included.

D. Interpretation of the statistical data was made through the aid of Dr. W. D. Baten* and G. G. Speeker*.

III. DISCUSSION

A. Importance of the Industry.

1. Value of the Crop.

The citrus industry has reached such huge proportions that in 1934-35 the annual farm value of these fruits was

*Dr. W. D. Baten and G. G. Speeker are Associate Professors of Mathematics, Michigan State College, East Lansing, Michigan.

over $134,000,000. Of this amount, oranges brought in returns of $100,000,000; grapefruit, $16,750,000; and lemons, $17,250,000. (1)

2. Number of People Working in the Industry.

During the 1936-37 season, 110,000 people had full or part time work in the Florida citrus industry during the shipping season, September to June, and 25,000 of these had employment, mostly full time, during the summer. (6) Charles C. Teague, President of the California Fruit Growers Exchange, estimates the number of people deriving their livelihood from the citrus industry in California to be at least 200,000 (21)

Texas Bureau of Labor Statistics was unable to estimate the number of people employed in the citrus industry*.

The people affected by the citrus industry are not limited to those actually raising the fruit, as much of the labor concerned is connected with the marketing of the crop. Lumber for crating mounts into thousands of board feet each year. Transportation facilities, including railways, trucks and boats, are used to take products to distant markets. Jobbers and dealers of various sorts handle the fruits before they reach the spot at which they are finally consumed.

3. Acreages.

a. Oranges

The total acreage of bearing and non-bearing trees is estimated by J. W. Thompson to have been around 525,000 acres.(7)

*Correspondence of April 13, 1939

248

According to the table of acreages on Page **248** , the total acreages of bearing orange trees five years and over, in the four leading orange-producing states amounted to 452,034 as of July, 1937.

The two states, California and Florida lead the field. California's acreage of bearing trees is estimated at 221,242 acres or 48.9% of the acreage of the four leading orange-producing states; while the rival state, Florida, boasts 202,076 acres or 44.7%. Texas production of oranges comes from 22,470 acres, or 4.9% while Arizona has plantings of bearing trees to the extent of 6,246 acres or 1.4% (Graph I)

b. Grapefruit.

Florida and Texas produce most of the grapefruit in this country. Florida plantings cover 83,168 acres, while those of Texas cover 74,439 acres. California had in 1937, acreages of grapefruit amounting to 16,853 and Arizona, her neighbor, claimed 12,651 acres. (Graph II)

c. Tangerines.

The raising of tangerines is mainly limited to Florida on its 24,509 acres. However, California has 1,602 acres, Texas 606 acres, and Arizona 54 acres. (Graph III)

d. Lemons.

California alone at present grows lemons commercially and has 47,139 acres devoted to this fruit. On these acres she grows most of the lemons consumed in the United States.

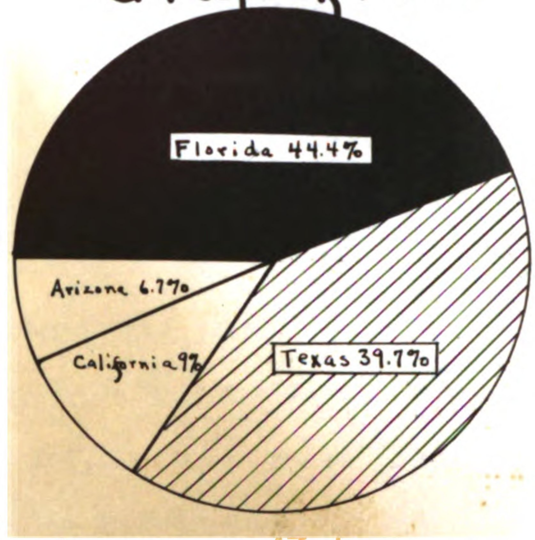
e. Total Citrus Acreages.

The total citrus acreages for the four leading citrus growing states appear from these estimates to be:

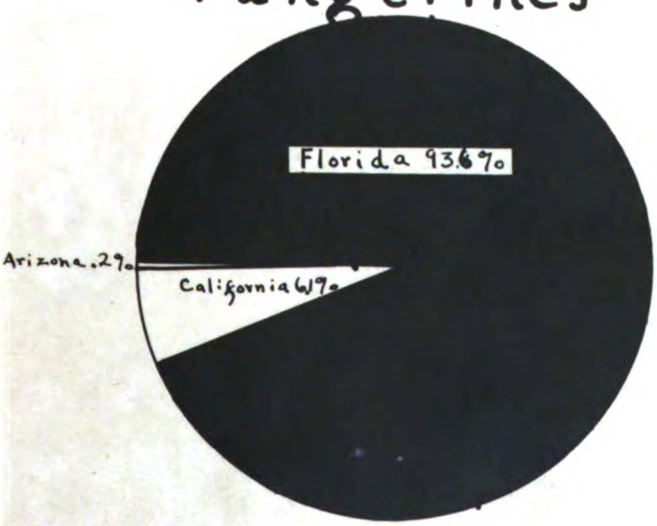
Location of Citrus Acreages

Graph I
Oranges

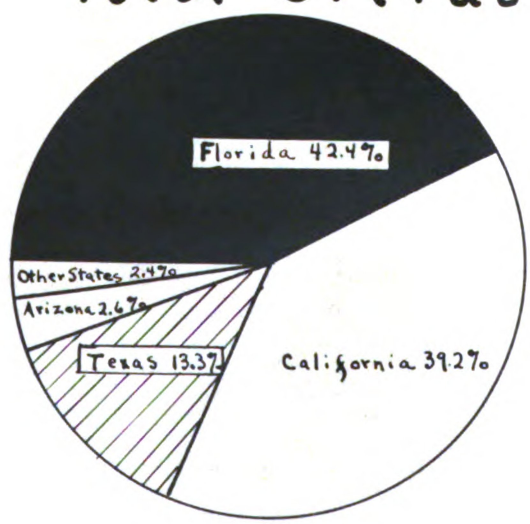
Graph II
Grapefruit



Graph III
Tangerines



Graph IV
Total Citrus



Florida, 309,753 acres; California 286,836 acres; Texas 97,515 acres; and Arizona 18,951 acres. Three other states, Alabama, Mississippi and Louisiana grow a combined total of approximately 17,500 acres, making the total number of acres of citrus fruit in the United States in the neighborhood of 730,500 acres. (Graph IV)

B. Production of Citrus Fruits.

1. Areas of Production.

The areas of production of citrus fruits in the United States are limited by climatic conditions to three main centers. These regions might be called the southern humid region, the southwestern irrigated region, and the central irrigated region.

a. Southern Humid Region

The southern humid subtropic region, including Florida and the Gulf border of neighboring states, is one of the principal citrus regions. The citrus development began in eastern Florida near St. Augustine and along the Indian River. In the north-central Florida region, early plantings were in the general vicinity of Palatka and Ocala, as far south as Lake Monroe. The vicinity of Tampa Bay and southward is the location of the development of the industry on the west coast. As has previously been stated, production in the northeastern section was fairly important, but the freeze in the winter of 1894-95 practically wiped out the industry there. Since then, the center of the industry has moved farther south, into the central ridge section and the southern coastal region. (1)

Because of the cold resisting ability of the Satsuma which was demonstrated in the freeze of that fatal year (1894-95), the region producing this fruit has spread from its beginning along the St. Johns River and near Jacksonville. Now the Gulf coast region in western Florida, Alabama, Mississippi, Louisiana and Texas produce this fruit also. (1)

b. Southwestern Irrigated Region.

The citrus industry in the southwestern irrigated region is established principally in the southern coast and interior valley sections of California. The fruits grown in the southern coast region are almost entirely sweet oranges and lemons. In the interior valley section the fruits are the sweet orange and the grapefruit. Grapefruit are now being grown in another section of this irrigated region, the southern part of Arizona. The northern coast districts of California are less important, but furnish some fruits. (13)

In the interior valley region is the territory inland from San Francisco, and includes all the country not immediately adjacent to or within the influence of the ocean. The interior valley regions are sometimes divided into the Imperial valley region, and the Central District. The latter lies principally in Tulare County. United States Department of Agriculture Statistics use this division. The southern coast region includes all the citrus country between the mountains and the sea as far north as Santa Barbara. The northern coast region includes all the country within the influence of the sea from Santa Maria as far north as Sonoma County. (13)

c. Central Irrigated Region

In the lower Rio Grande Valley of Texas, a more recent establishment of the citrus industry is based principally on the grapefruit and to a lesser extent on the sweet orange. The district is limited mainly to three counties, Cameron, Hidalgo, and Willacy.

2. Volumes of Shipments of Citrus Fruits.

a. Record of Shipments.

The exact amount of production of the various fruits would be impossible to ascertain, for local consumption is a factor which cannot be determined. However, the phase in which the buyer of citrus fruits in the eastern and northern part of the United States is interested, is not the local consumption in Florida, California and Texas, but the amount of fruit entering into wholesale trade. These figures are collected by the United States Department of Agriculture, Bureau of Agricultural Economics, and published. Movement by rail in carlots can be easily found. Movement by truck is more difficult to compute. However, the Bureau has collected all such data possible and converted truckloads into carlot equivalents. Similarly the boat shipments have been reduced to carlot terms, in order that all shipments may be given in similar terms.

b. Orange Shipments.

The total orange shipments in the United States have more than trebled in the last twenty years. The oldest complete record of shipments assembled by the United States Department of Agriculture was for the year 1918 (Table V), that Department having started to keep records of the same in October, 1917 (Table II). The total for 1918 was 28,444 carloads;

whereas the six seasons studied in detail in this writing, 1932-37 had an average of 91,582 carloads. (Graph V) But as shown in Graph XIV, fluctuations in orange production are large, with crops ranging so that during these six years referred to, shipments varied between 81,317 carloads in 1932 and 102,629 carloads in 1935, the largest production on record prior to 1938. (Table LXXVIII).

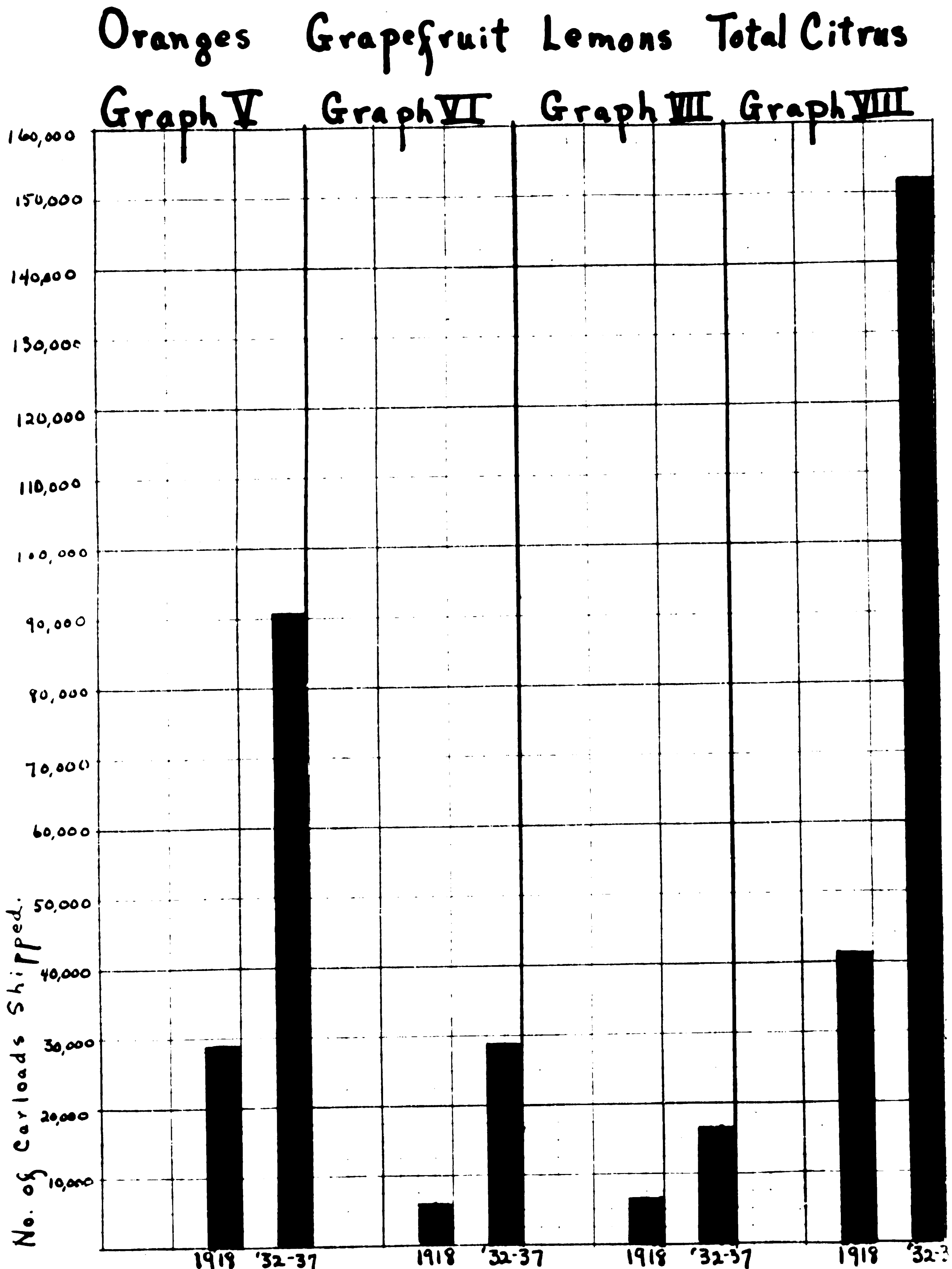
Almost all of the oranges are produced in California and Florida. (Graph XV, Tables XLIV, XLV, XLVI, XLVIII, LIII). The other states, Texas and Arizona, Louisiana, Alabama and Mississippi produced a combined total of only about 4.5% of the United States total, in 1937 and 3% for 1932-37 average (Tables XLVII, XLIX, L, LI, and LII). Texas had a phenomenal rate of increase in production and now produces more than the other minor states combined. In 1932 the shipments of Texas were but 200 carloads, while in 1937, through a steady increase, the shipments of that state had reached 3,650 carloads. (Table XLVII).

California and Florida Shipments.

Throughout these six seasons studied, 1932-1937, the average shipments from California were 57,772 carloads, or 63% of the United States total production; and that of Florida 31,563 carloads, or 34%. (Graph IX). As a result of the severe freeze, California shipments for 1937 dropped to a figure near 42,600 carloads, while Florida shipments were the highest ever recorded, about 39,316 carloads.

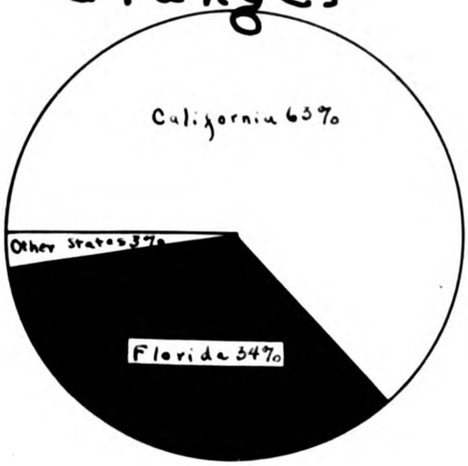
The trend of production has been steadily upward. The

Increase in Citrus Shipments 1918 and 1932-37 Averages

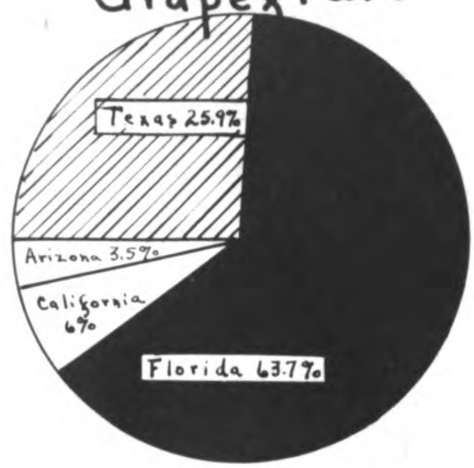


Origin of Shipments by Regions

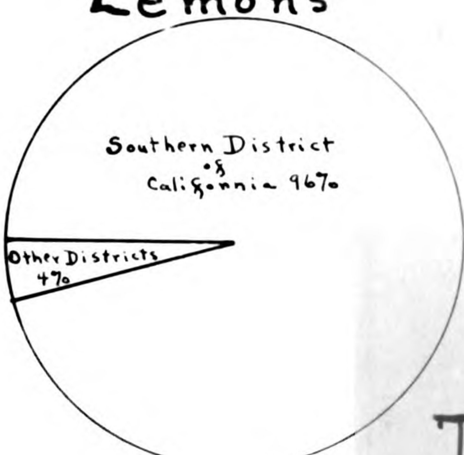
Graph IX
Oranges



Graph X
Grapefruit

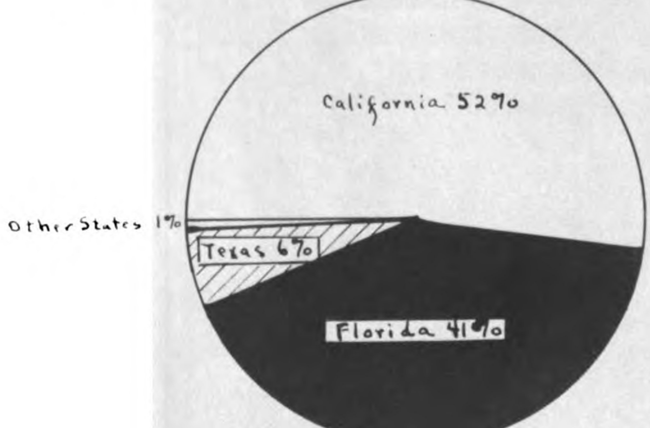


Graph XI
Lemons

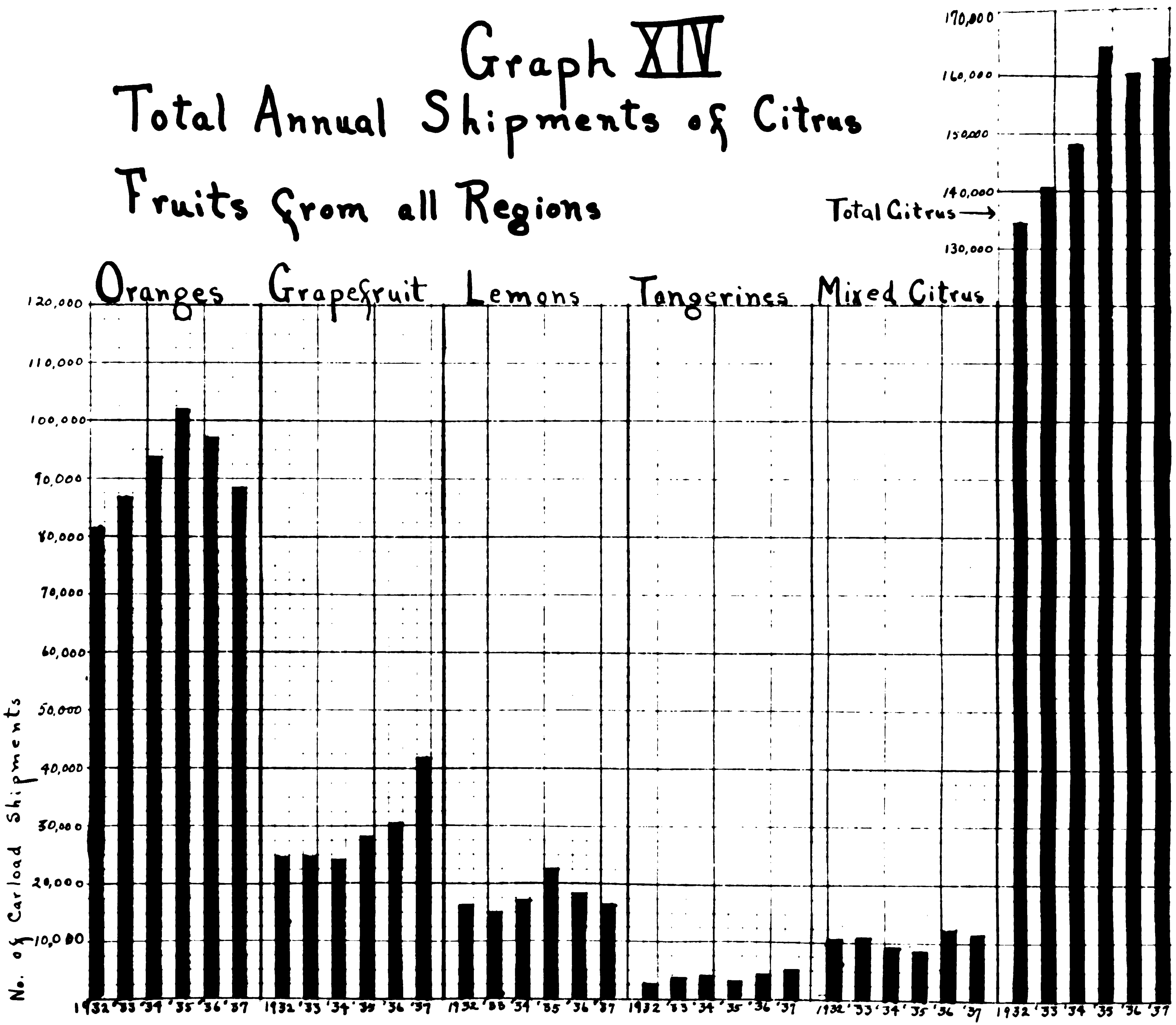


Graph XII
Tangerines

Graph XIII
Total Citrus

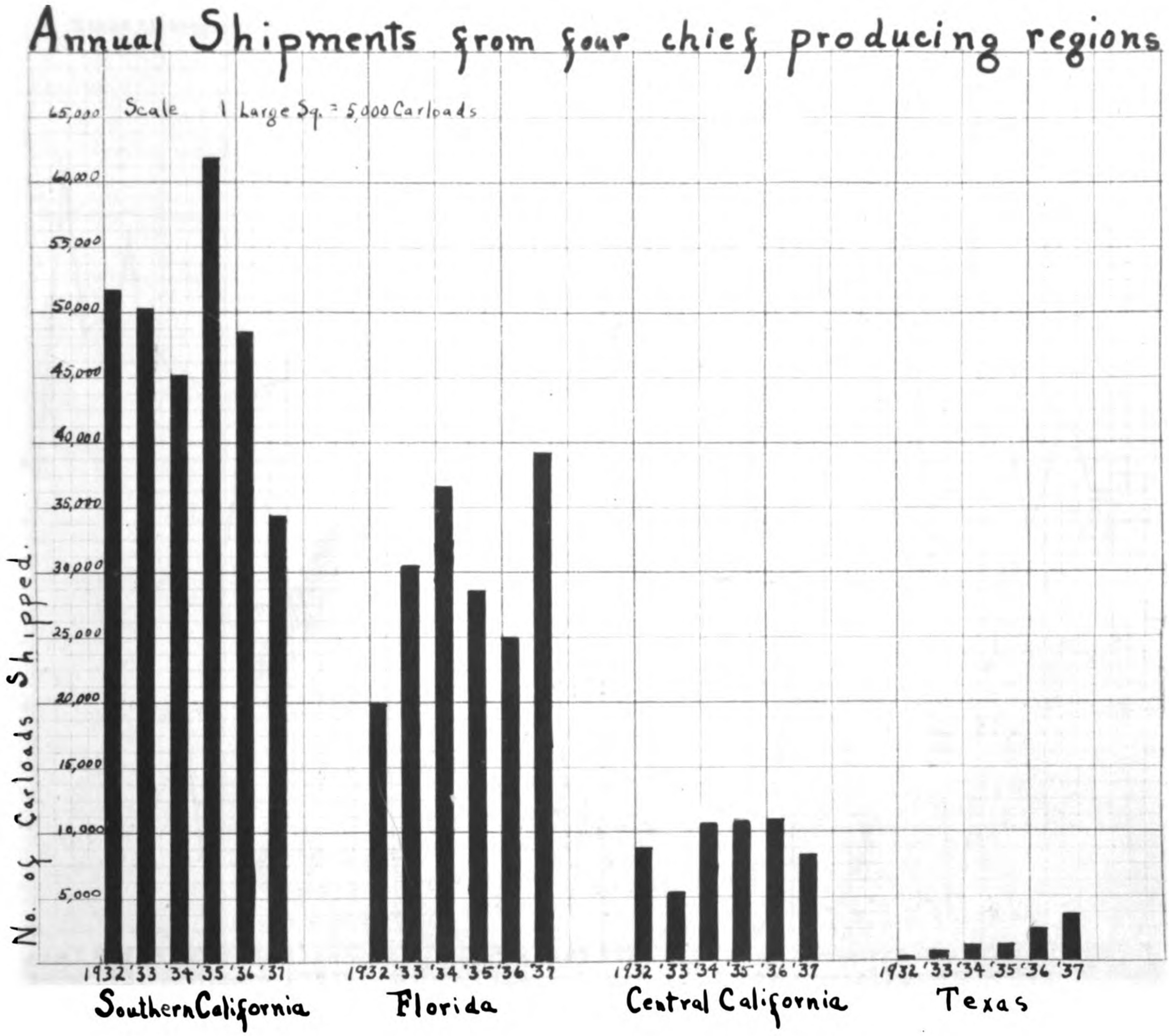


Graph XIV
Total Annual Shipments of Citrus Fruits from all Regions

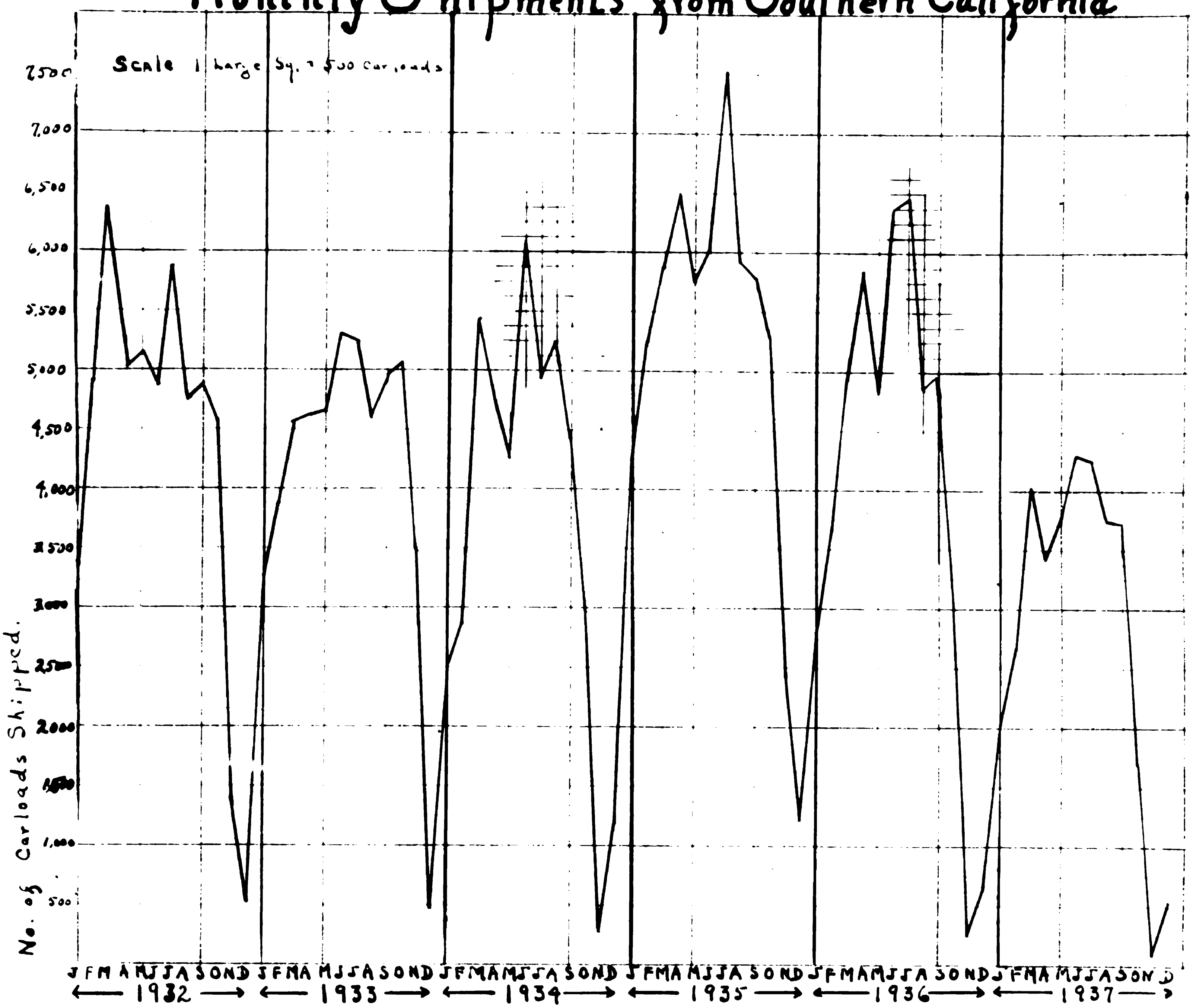


Graph XV

Oranges

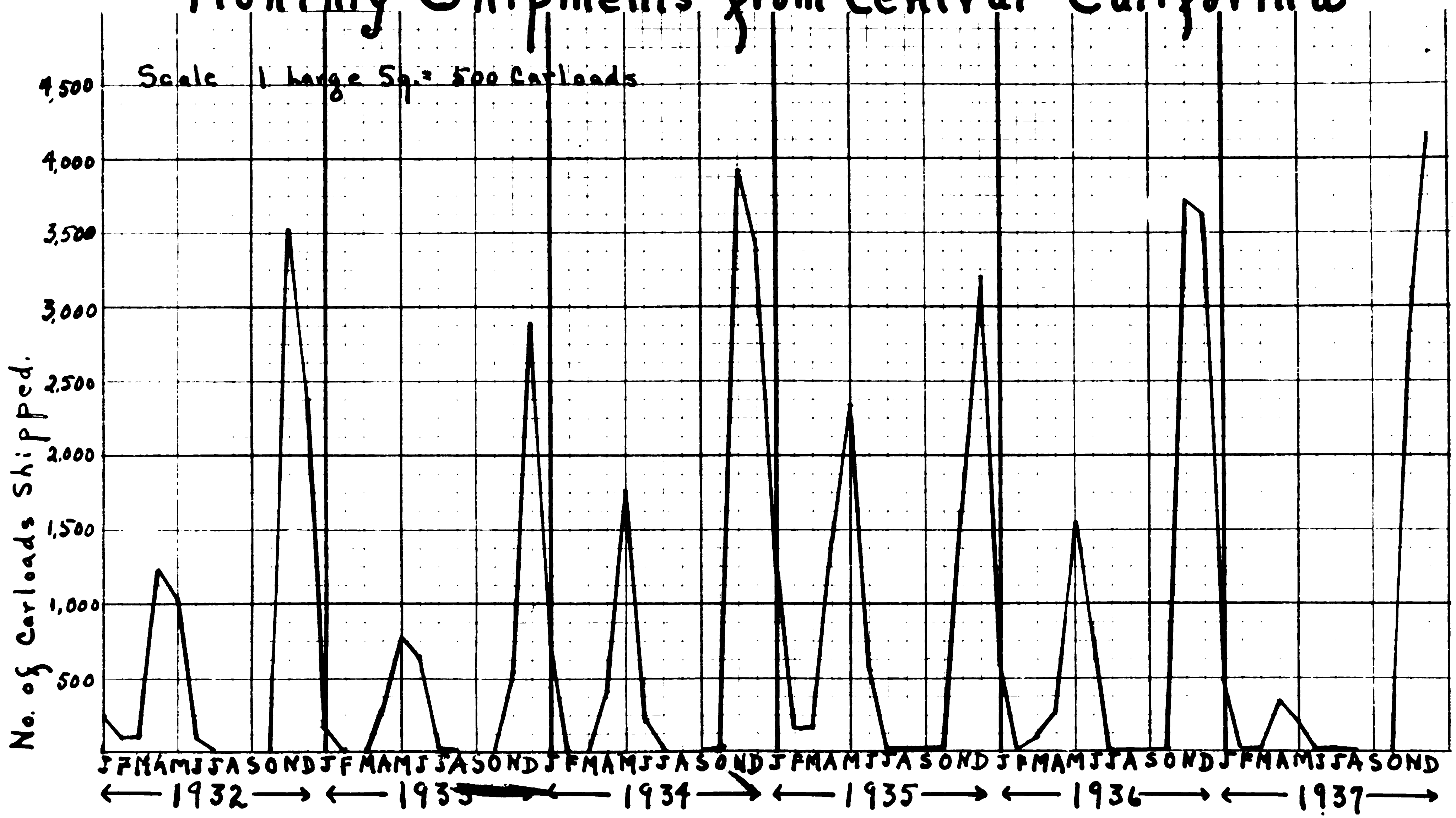


Graph XVI
Oranges
Monthly Shipments from Southern California



Graph XVII
Oranges

Monthly Shipments from Central California



trend line for yearly production is shown on Graph XIX. However, the year-to-year fluctuations are often rather large, as is evidenced from Graph XIV. These variations are due mainly to frost, wind, and heat, but in a few cases, to drought or hurricanes. Since the freeze of 1937, orchard heating is being used more extensively in California. (7).

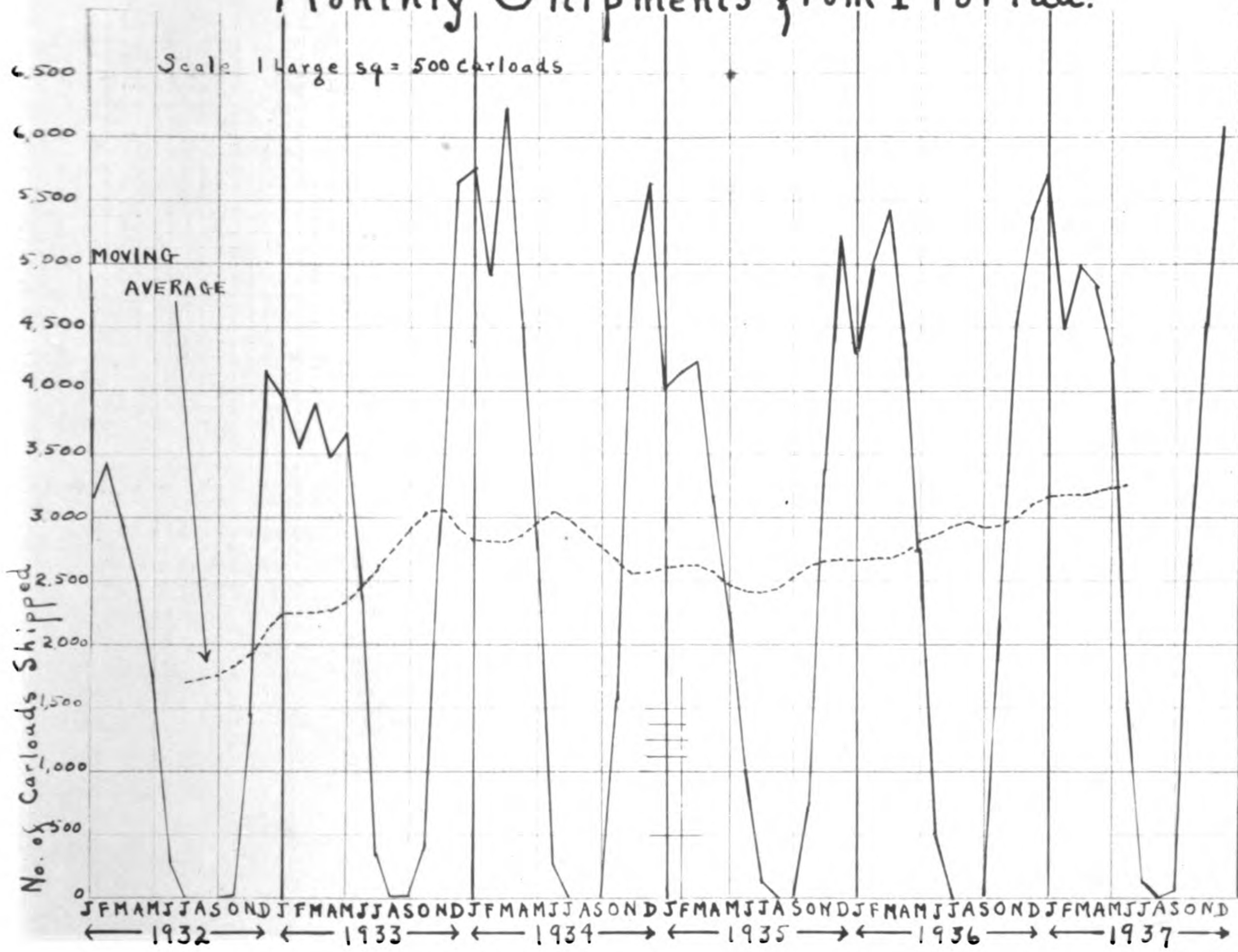
Monthly shipments from each region varies. Southern California has heavier production during spring and summer months (Graph XVI). The peak of central California production is in November or December (Graph XVII), with a lesser peak in May. Florida shipments reach huge proportions from December to May (Graph XVIII).

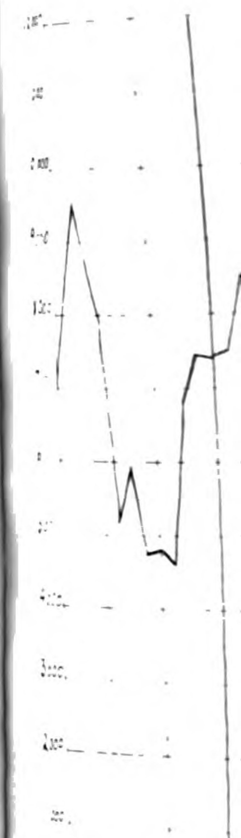
c. Grapefruit Shipments.

The total United States grapefruit shipments have been multiplied by five in the last twenty years. During the 1918 calendar year 5,650 carloads were shipped; whereas the six seasons, 1932-1937, averaged 28,905 cars. (Table IV, LXXVII, Graph VI). The increase in the last six years is outstanding. (Table VII, XII, XVII, XXII, XXVII, XXXII). In each year 1932 to 1934, the shipments were around 24,000 carloads. In 1935 this was increased to about 28,000 and in 1936 to around 30,000 carloads, and the year 1937 found 41,790 carloads on the market.

Almost all of the grapefruit are produced in Florida and Texas, but California and Arizona together produced and shipped 2,806 carloads on an average. (Tables XXXIX, XL, XLI, XLII, XLIII) This is a little less than 10% of the 28,900 carload average of

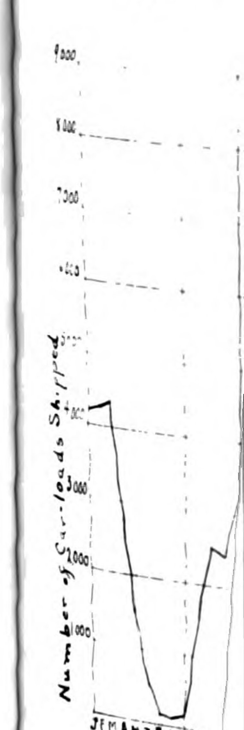
Graph XVIII
Oranges
Monthly Shipments from Florida.



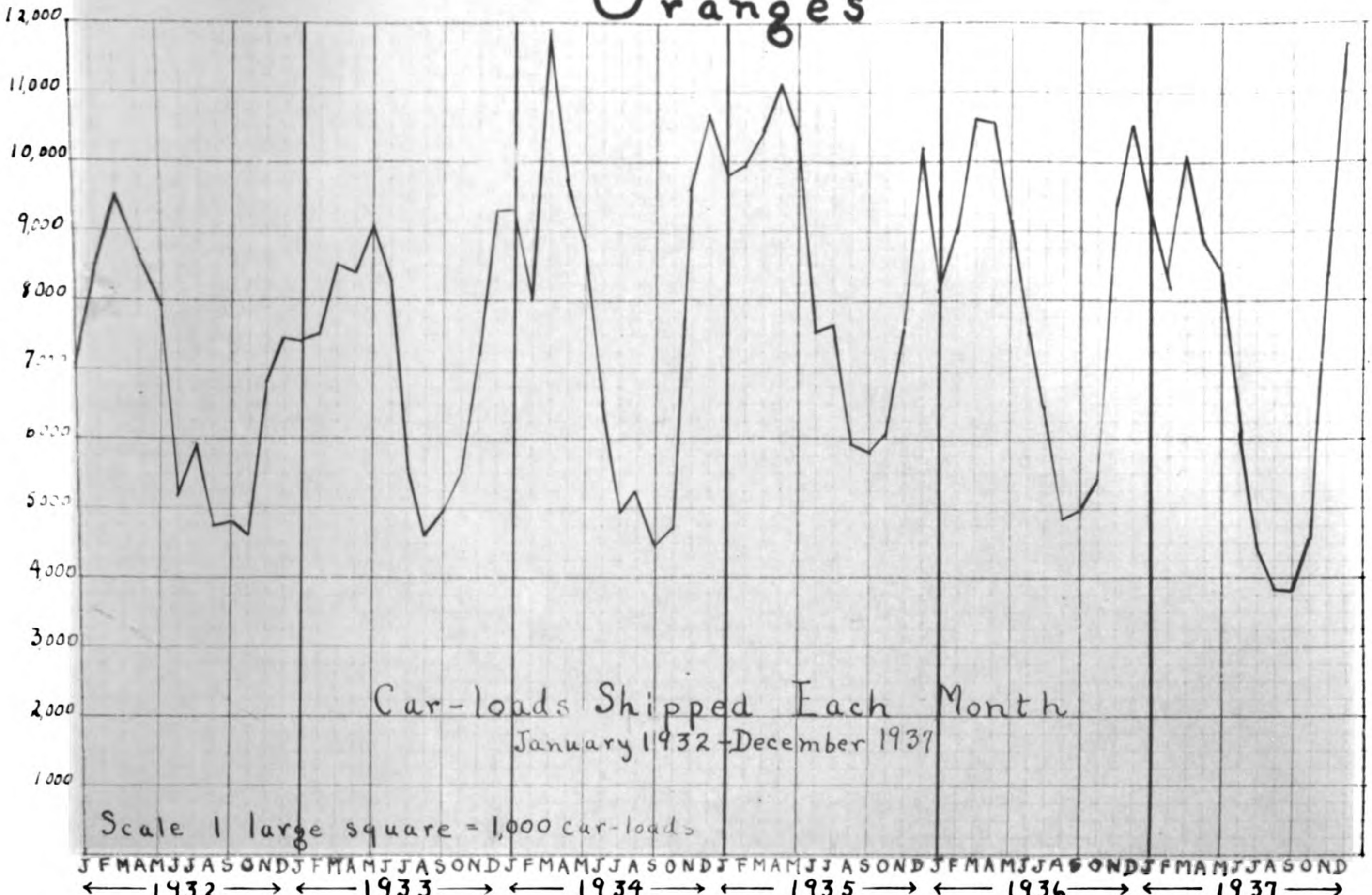


Scale 1 larg

JFMAMJJASOND
←1932→



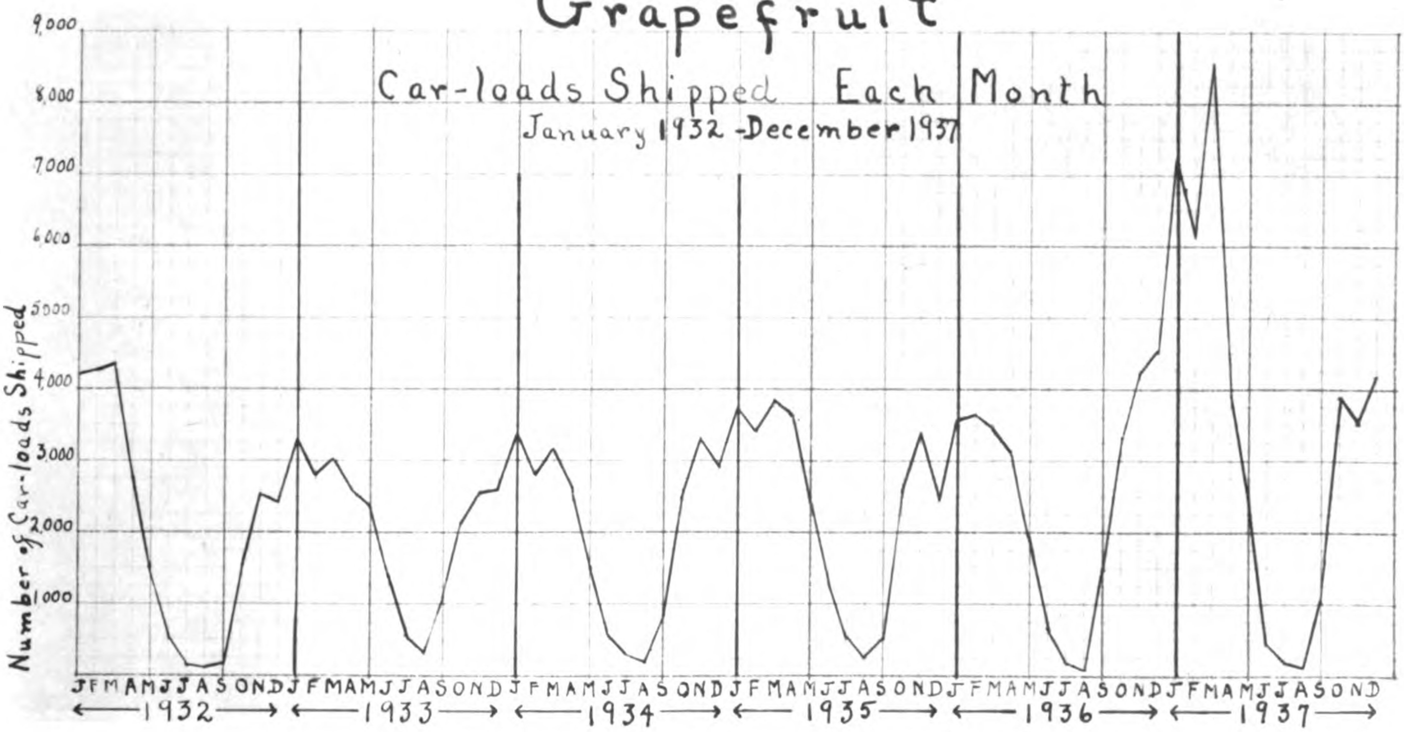
Graph XIX
Oranges



Graph XX
Grapefruit

Car-loads Shipped Each Month

January 1932 - December 1937



the entire country. Of this 10%, California shipped about 6% and Arizona about 3.5%. (Graph X)

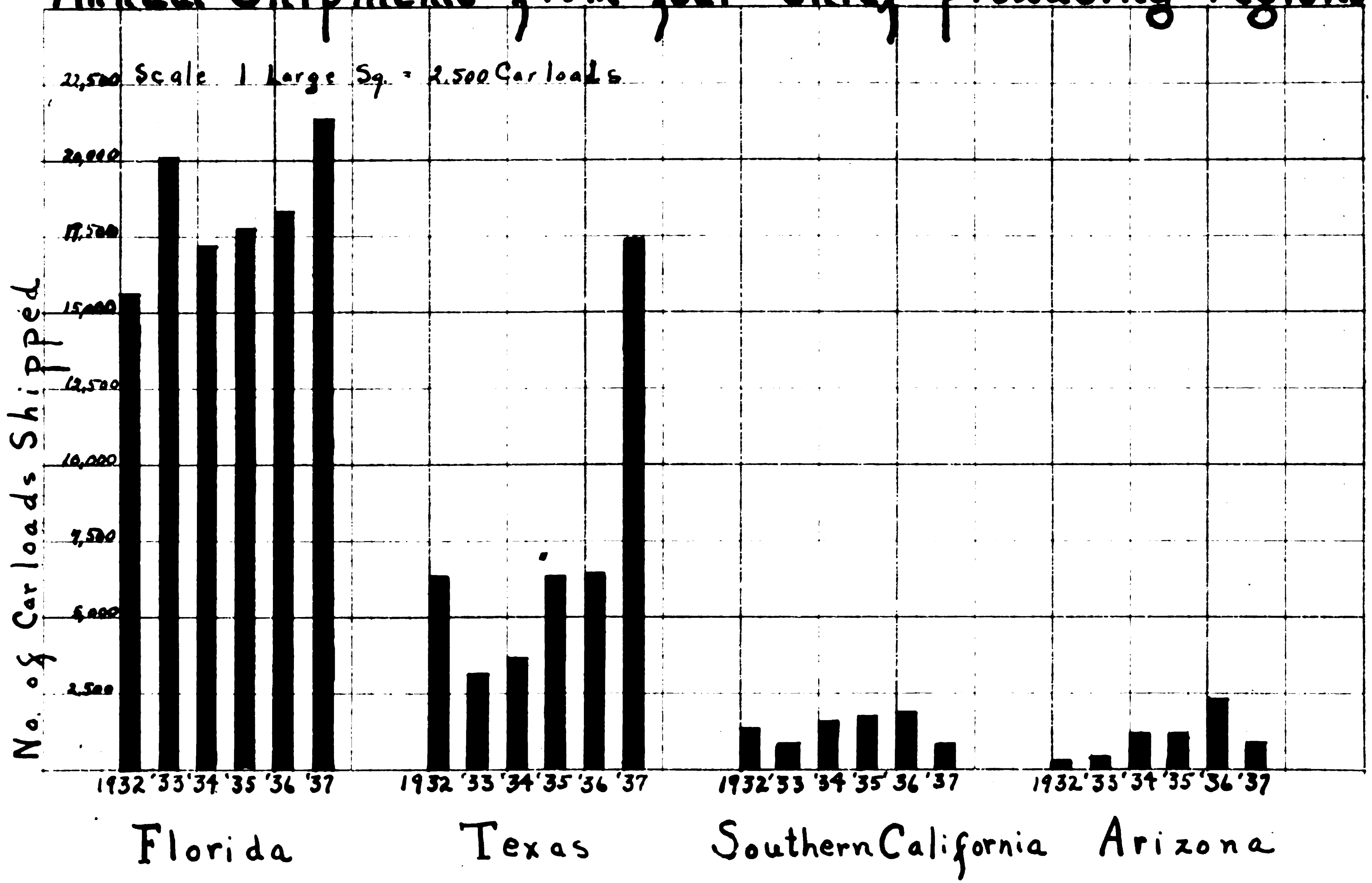
Within the last six years for which records can be obtained, a very interesting thing has happened in the grapefruit industry. Florida shipped from 15,600 carloads in 1932, up to 21,370 cars in 1937, other totals being between these two figures, these showing almost a steady increase, but for an exceptional year, 1933. (Graph XXI, Table XXXVII). The other leading state, Texas, however, shows a different picture. From 1932 to 1936 shipments ranged from 3,025 carloads to 6,900 carloads. (Table XXXVIII). Then the shipments from Texas for the year 1937 soared skyward to a figure of 17,000 carloads. (Graph XXI). The effect on the total grapefruit shipments is evidenced in Graph XXII. This is accounted for by the new trees of Texas plantings arriving at the productive stages. In 1937, according to the Table LXXXIII, 96% of the Texas grapefruit trees were less than 16 years old, the age at which they reach full productivity, and 76% were only five to ten years old.

d. Lemon Shipments.

The shipments of lemons, as stated in the discussion on varieties, originate almost solely in the Southern District of California. (Table LIV). The total United States shipments originating within the country have increased about two and one-half times in the last twenty years. In 1918 the total shipments of lemons from internal sources were about 6,900 carloads. In the six-year period, 1932-1937, the average annual shipments were

Graph XXI
Grapefruit

Annual Shipments from four chief producing regions

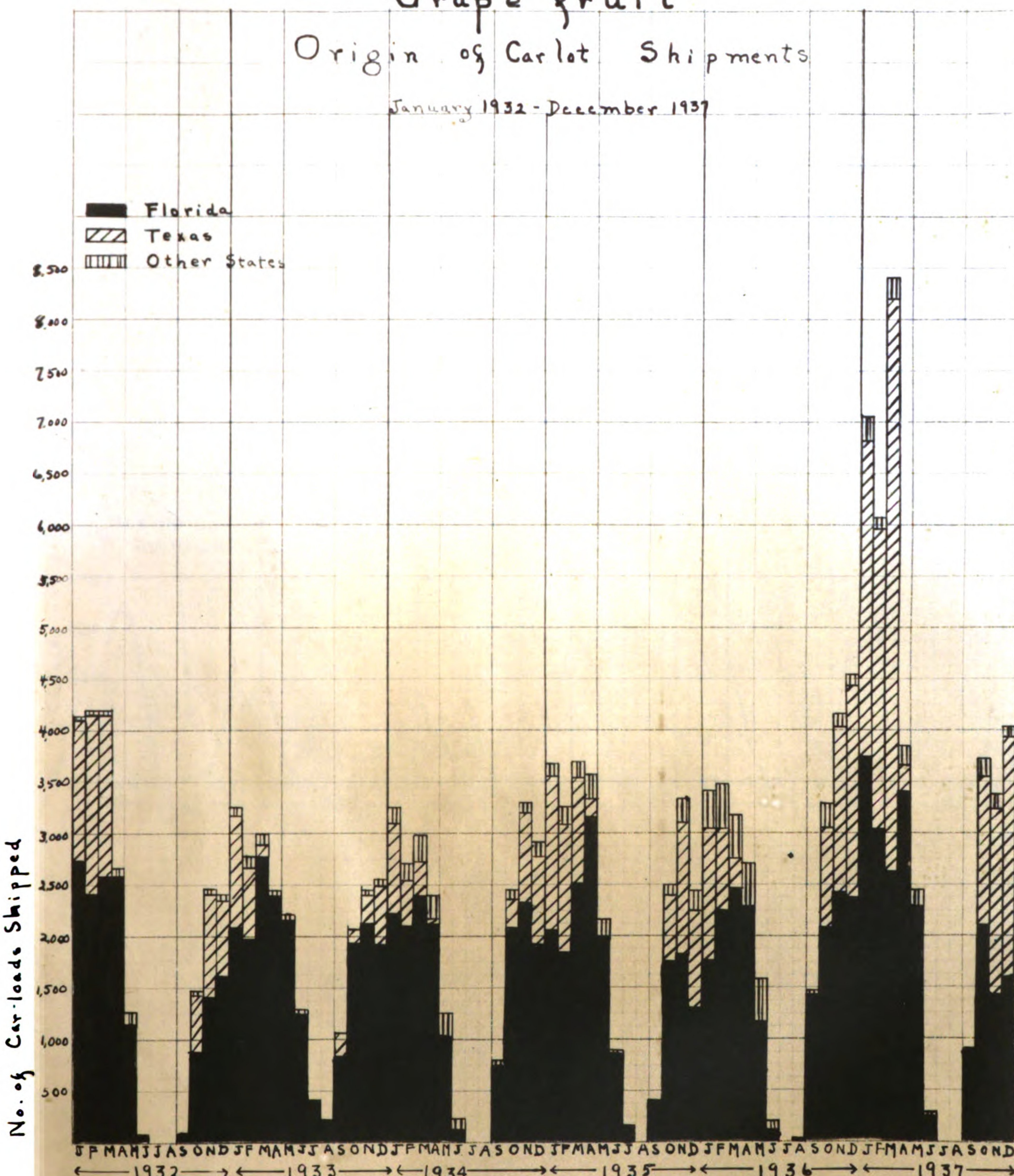


Graph XXII

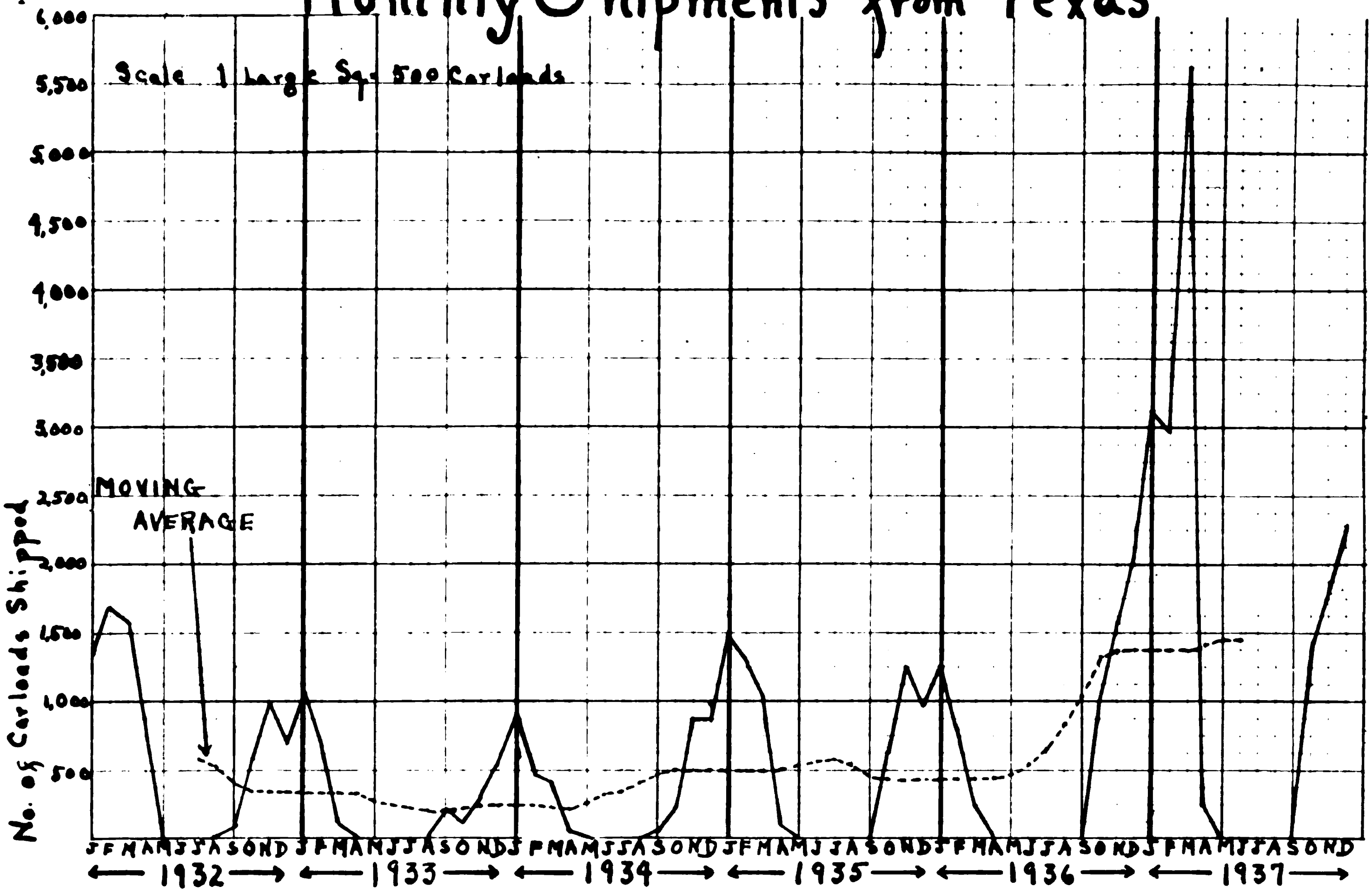
Grape fruit

Origin of Car lot Shipments

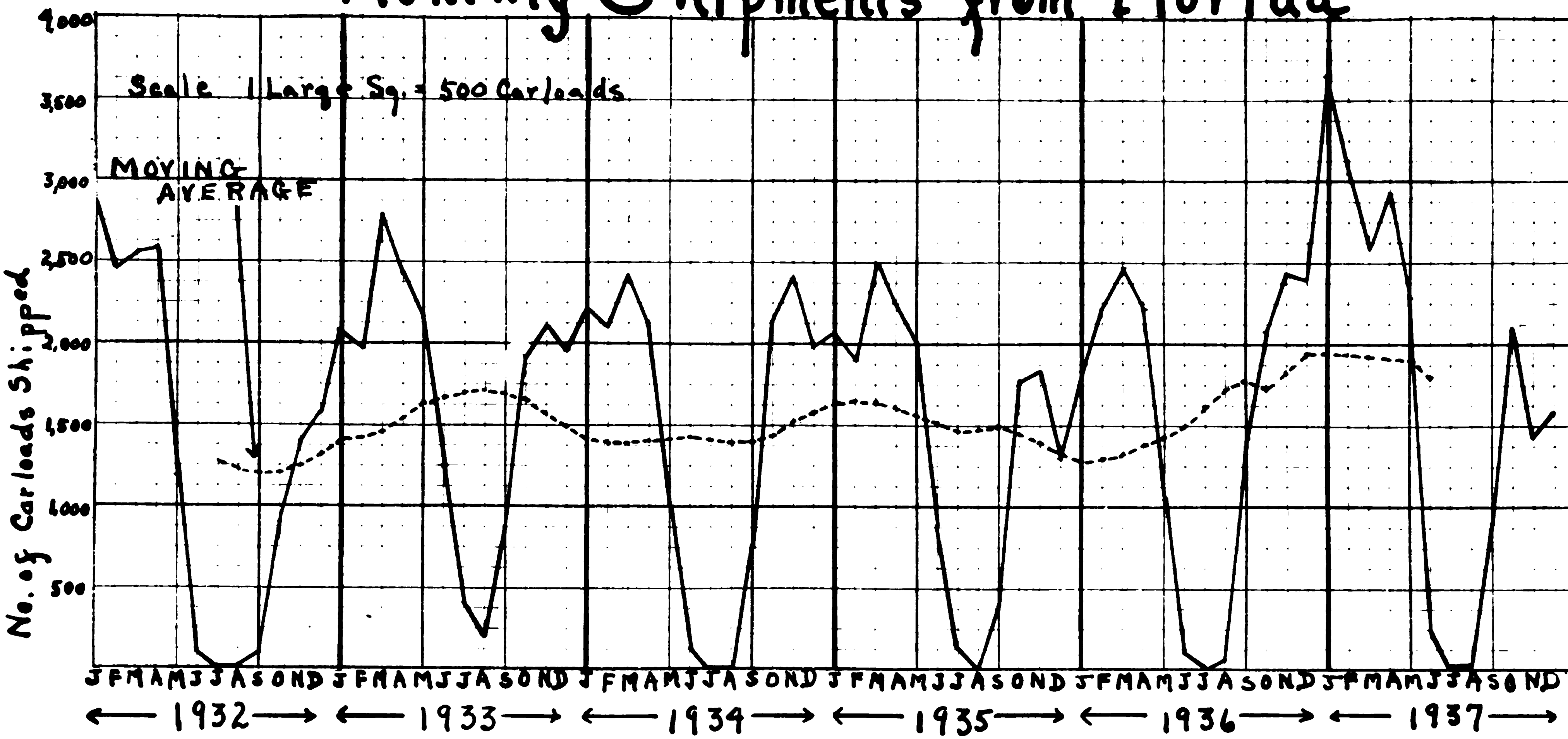
January 1932 - December 1937



Graph XXIII
Grapefruit
Monthly Shipments from Texas

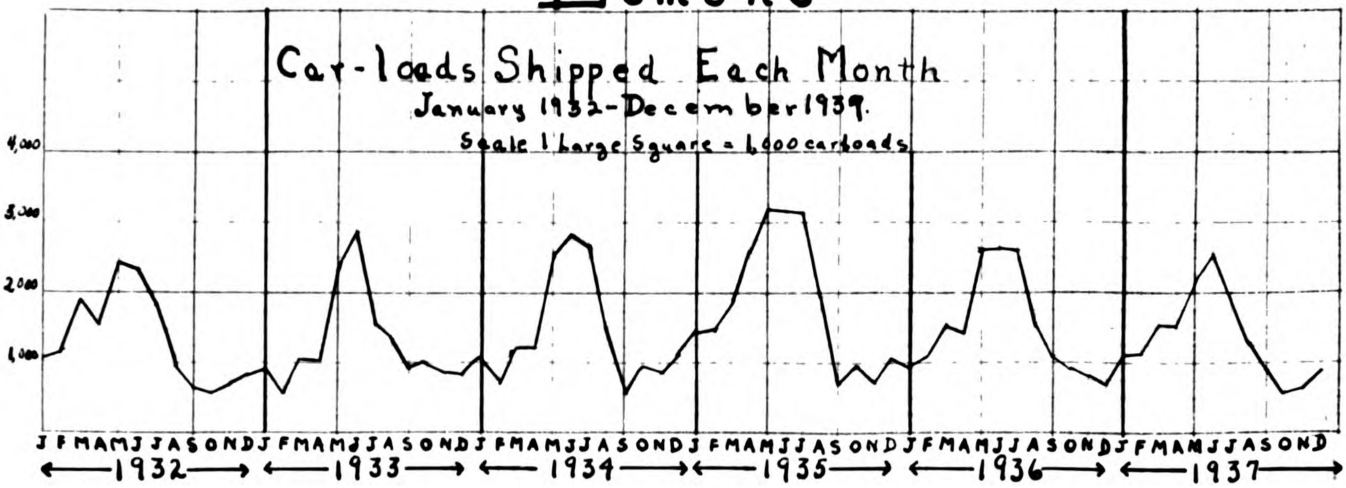


Graph XXIV
Grapefruit
Monthly Shipments from Florida



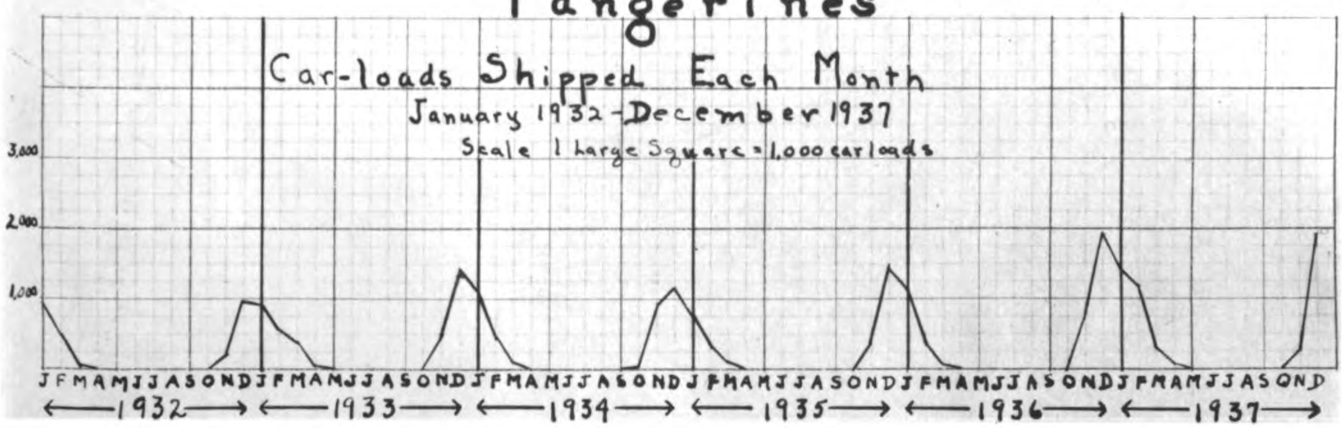
Graph XXV

Lemons



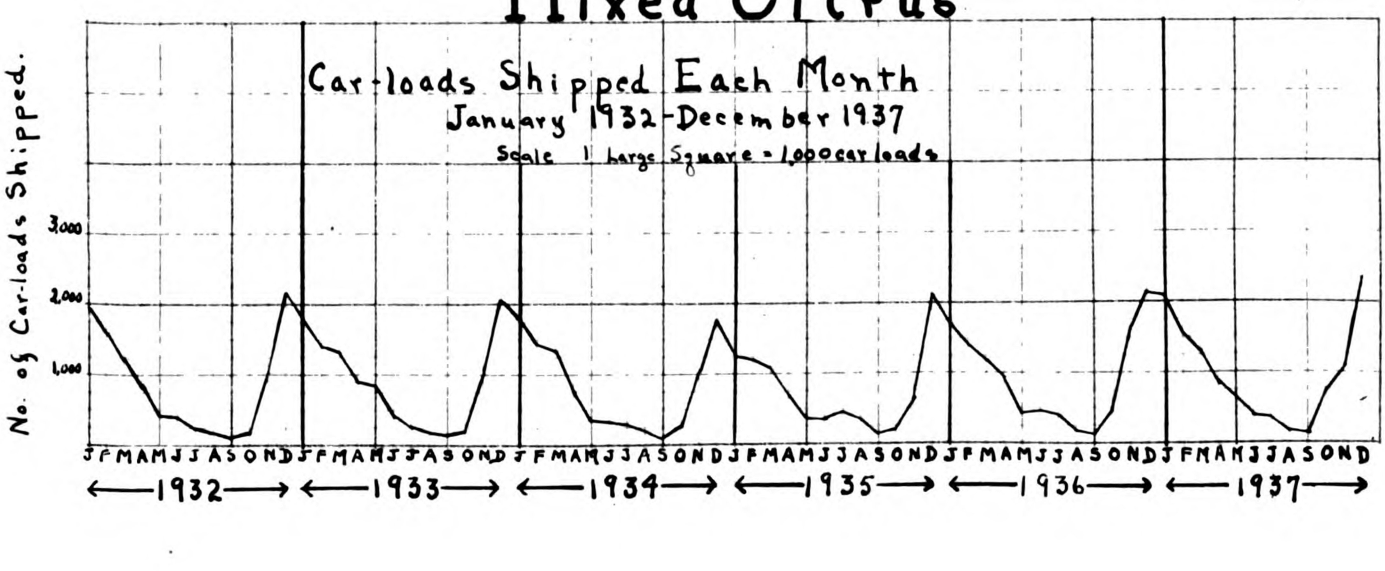
Graph XXVI

Tangerines



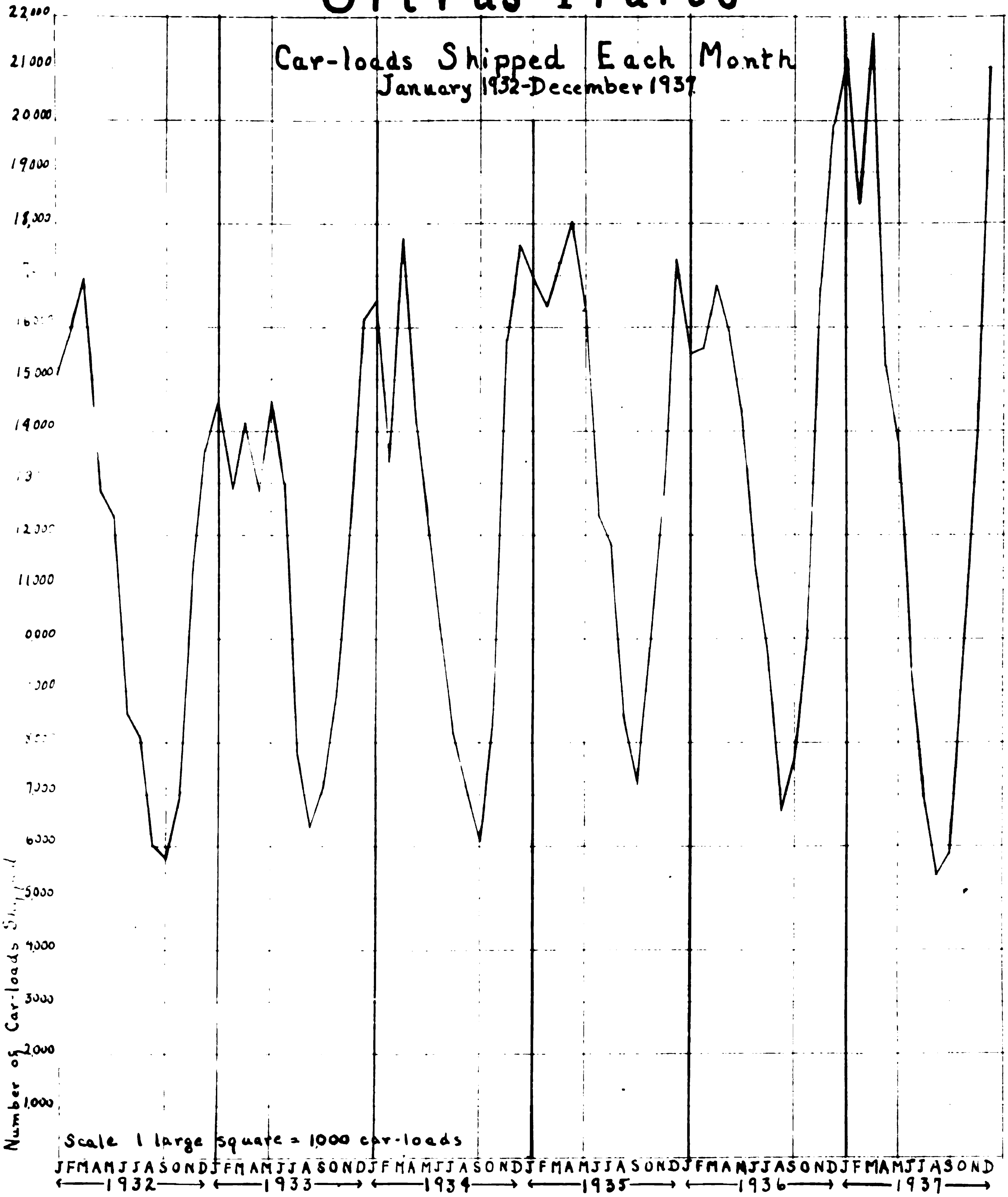
Graph XXVII

Mixed Citrus



Graph XXVIII

Citrus Fruits



17,250 cars. (Table LXXIX, Graph VII). Of these shipments the Southern District of California provided an average of about 16,600 carloads, or about 96% of the total crop. (Graph XI, Tables LIV, LV, LVI, LVII). Monthly shipments reach peaks in early summer. (Graph XXV)

e. Tangerine Shipments.

Another fruit originating almost entirely from one section of the country is the tangerine. Of the 22,762 carloads shipped in the six-year period, only 113 carloads were grown outside of the State of Florida. (Table LVIII) These were grown in California. Therefore, Florida furnished 99.5% of the crop, and California provided only ½ of 1%. (Tables LIX, LX, LXI, Graphs, XII, XXVI).

f. Mixed Citrus Fruits Shipments.

The mixed citrus fruits consist of carloads packed with a mixture of citrus fruits in each car. Since the proportion of each fruit is unknown, it would be impossible to discuss the fruits in this case. However, these figures are combined with the others to calculate the total citrus fruit shipments. (Tables LXII, LXIII, LXIV, LXV, LXVI, LXVII, Graph XXVII).

g. Total Citrus Fruit Shipments.

Totaling the citrus fruit shipments for the last six years of recorded information, a composite view of the citrus industry is found. The total citrus shipped has more than trebled since 1918. That year 41,000 carloads were moved through the transportation systems. In the 1932-1937 average, almost 152,000 carloads entered into the trade of the country. (Table

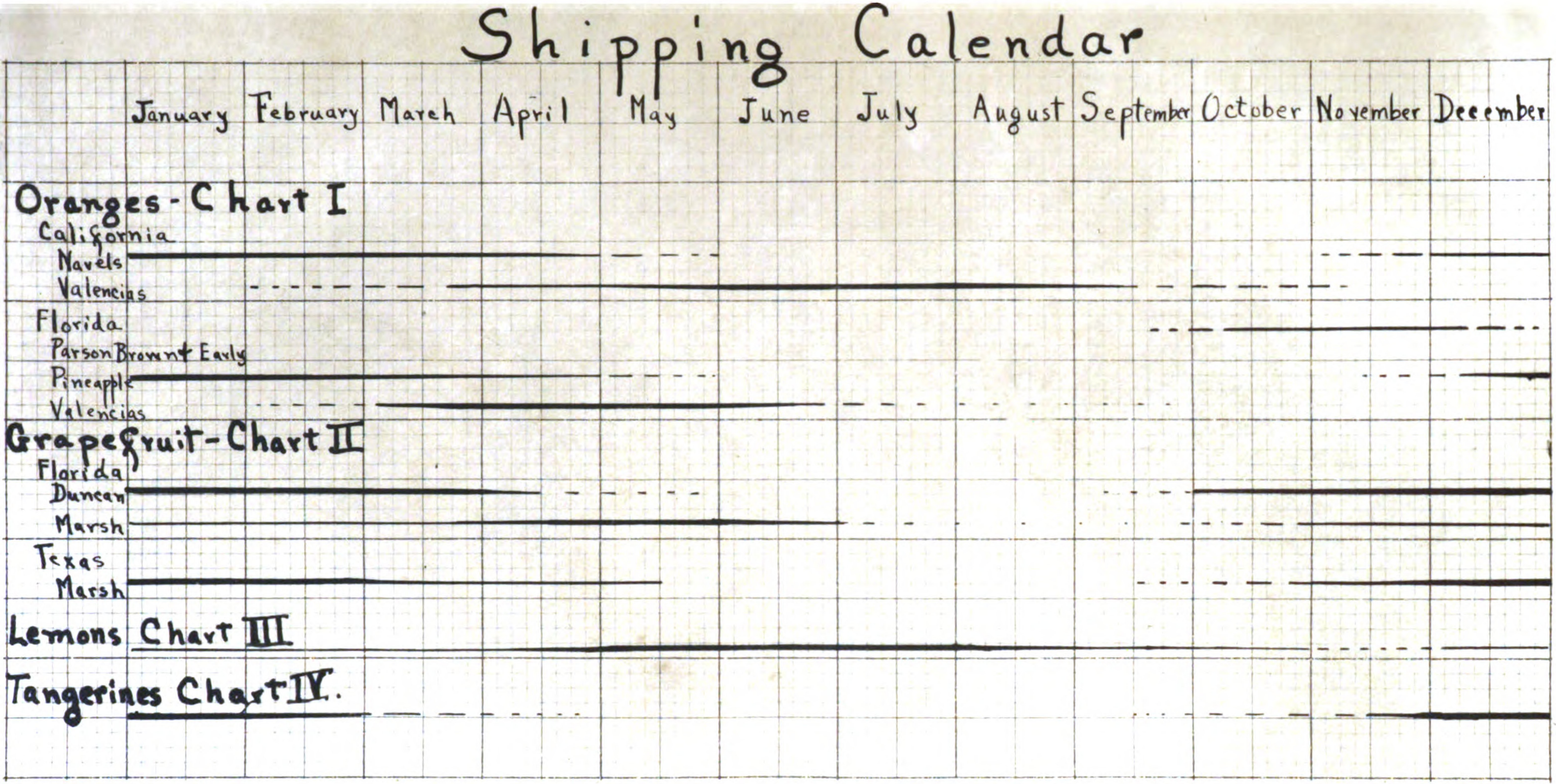
LXXXII, Graph VIII). Monthly totals vary greatly with different fruits reaching peaks. (Graph XXVIII)

Almost all of the total citrus shipments are traced to three states. California shipped about 479,000 of the 911,000 carloads, or about 52%; Florida furnished about 368,000 carloads, or about 41%; and Texas sent about 54,000 carloads, or about 6% of the entire amount; and the other states, Arizona, Louisiana, Alabama and Mississippi provided only about 1%. (Tables LXVIII, LXX, LXXII, LXXIII, LXIX, LXXI, LXXIV, L, LXXV, LXXVI, Graph XIII)

3. Seasons of Production of Citrus Fruits.

Oranges from different localities furnish a supply of the fruit over the entire year. California furnishes the two leading varieties, shipping from 5,000 cars to 10,000 cars per month. The season for Navels and other miscellaneous varieties which constitutes 43% of the California crop, begins with a few shipments in November. The bulk of that crop is sold during November to April. A few are still on the market in May. The Valencias from California, which make up 57% of that state's total orange figure, begin with small shipments in February and March. (Graph XXIX) By May the crop is in full swing, with huge shipments in each of the months May through October, with a peak about June or July. (7) (Chart I)

The orange crop from Florida is more variable, due particularly to the greater number of varieties, and to the entirely different climatic conditions. The Florida season opens with Parson Brown and some other minor varieities in late Setpember or early October. This variety reaches a peak in November


Shipping Calendar
January
February
March
April
May
June
July
August
September
October
November
December
Oranges - Chart I
California
Navels
Valencias
Florida
Parson Brown + Early
Pineapple
Valencias
Grapefruit - Chart II
Florida
Duncan
Marsh
Texas
Marsh
Lemons Chart III
Tangerines Chart IV.

and disappears from the market by December. The next variety to appear from Florida is the Pineapple orange. Shipments of these begin in November, and last through May. Large amounts of these appear during December, January, February and March. The peak months are January,and February. These early varieties comprise about 60% to 65% of Florida's orange production (Graph XXX) Florida Valencias first arrive on the markets in February. Shipments that month are small, but for March, April, May and sometimes June great amounts of the Valencias are marketed. These make up the other 35 to 40% of the Florida orange crop. During July, August and September only an occasional car of oranges leaves Florida. The seasons of these various varieties are represented in the form of a chart. (Chart II)

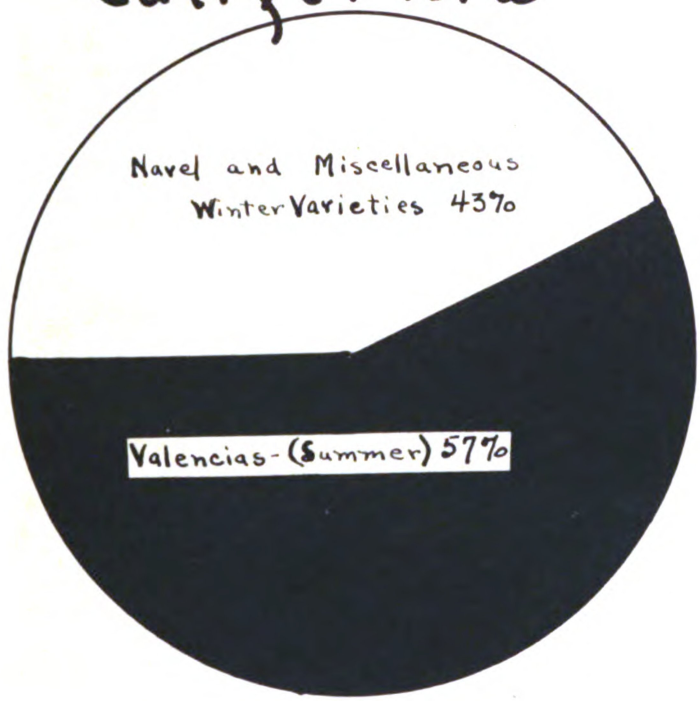
The Duncan grapefruit from Florida is shipped with the season beginning in September. Large quantities are on the market until the following April, with a peak production arriving from October to March. As stated before, germination of seeds is apt to occur in March or thereafter, so this variety dwindles from that date. (Chart III)

The Marsh (seedless) grapefruit season begins in the later part of September. The size of the shipments are fairly large and quite steady from October through February. In March, when the seedy varieties disappear because of the growth of seed mentioned above, the "tree-stored" Marsh variety shipments are abundant. These last through May, with but few appearing as late in the year as July.

Varieties of Oranges Shipped

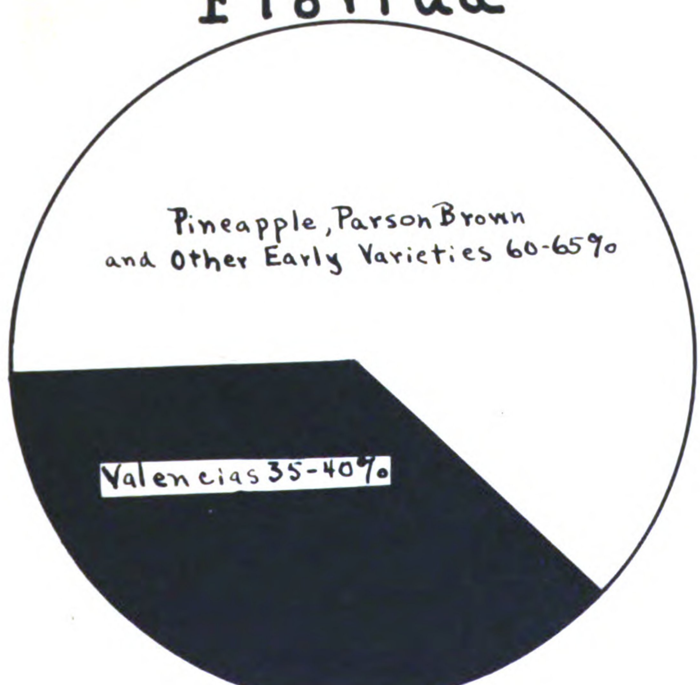
Graph XXIX

California



Graph XXX

Florida



Little grapefruit from Arizona and California appears on the eastern markets. The distance for transportation is great, the season nearly coincides with the Florida crop, and the product is, as yet, an inferior one. Therefore, the fruit is consumed mainly in the west.

Texas is growing mainly the seedless varieties, as has been stated before. The season again coincides with the Florida season for the fruit, and so the two states are rivals for the market. (Graphs XXIII and XXIV). The vast increase in Texas production has lowered the price. The grapefruit seasons are shown on a calendar chart on page 52.

The lemon is another year-round crop. However, the crop seems to reach its low ebb in November, and its peak in May, June and July.

The tangerine shipments begin with a few early fruits in October, but quantity production is seen from November through February, with a few shipments in March and April. The peak of the market is in December and January. (Chart IV)

4. Prediction on Future Production.

One way to predict the possible production for the years to come is to study the age of the trees. Coit (13) believes that if given proper care, some citrus trees will bear profitable crops up to fifty years of age or more, as the citrus trees are naturally long-lived. The limit given by some other authorities is placed at twenty-five years. Coit thinks this figure too low, and that if trees are grown on fertile soil and are well cared for, they will produce profitable crops to a very great age.

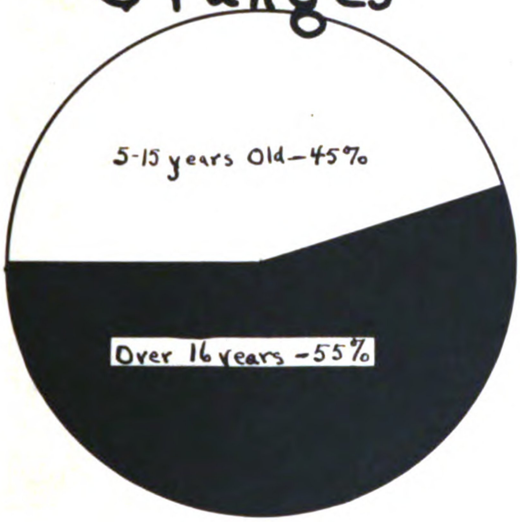
Trees up to five years of age have not yet reached the productive stage. From the age of five years, when trees start to bear, the productivity increases yearly until the trees reach the age of about sixteen years. R. H. Howard cites records proving this. All groves in the group which Howard studied were over ten years of age at the beginning of the record period, and averaged fourteen years at that time. The total of 1,011.5 acres in the fifty-five groves studied consisted of approximately 71% oranges, 25% grapefruit and 4% tangerines. During this study the average yield per acre on these fifty-five groves increased from 148 boxes per acre in 1930-31 to 191 boxes per acre in 1934-35. There was an increase in yield each year except for the crop produced in 1932-33 when approximately twenty percent of the fruit was destroyed by a wind storm. The increase in yield over the five-year period was probably no greater than the normal increase concurrent with the increasing age. (6)

The possible future production will apparently continue to increase, in view of the above. From table LXXXIII it is found that 69% of the grapefruit trees are from five to fifteen years old (Graph XXXII). The age of bearing orange trees in the states studied, is less than fifteen years for 45% of the acreage (Graph XXXI). Tangerine trees have not reached the full production stage in 63% of the groves (Graph XXXIII), while 34% of the lemon trees are in that group. (Graph XXXIV)

Age of Bearing Trees

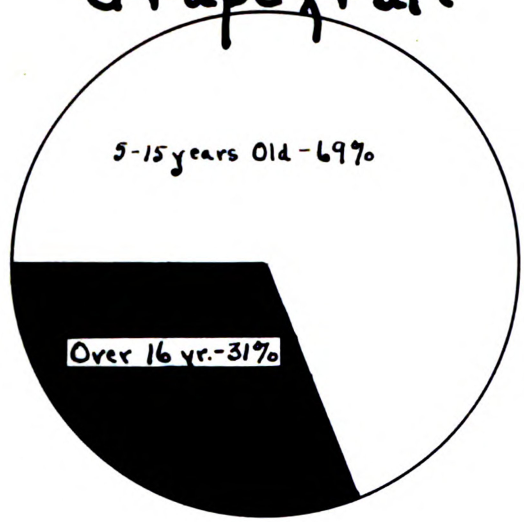
Graph XXXI

Oranges



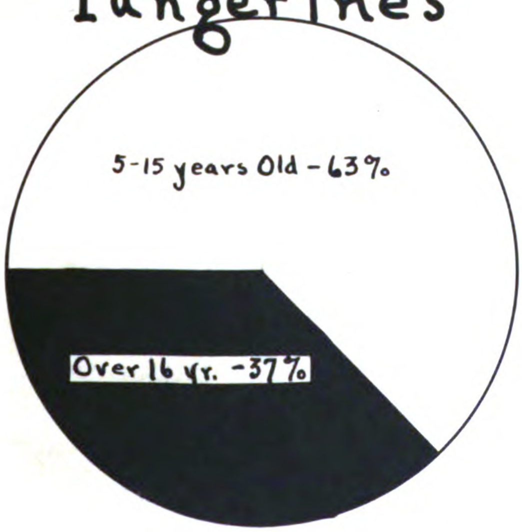
Graph XXXII

Grapefruit



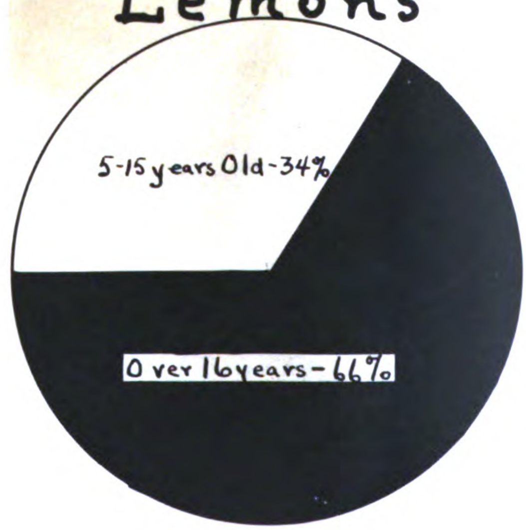
Graph XXXIII

Tangerines



Graph XXXIV

Lemons



Annual plantings furnish another criteria of judging the future production in this industry. The plantings of citrus trees in Florida were at a steady rate from 1921-22 to 1926-27, except in 1922-23 and 1923-24 when there was a very marked increase. Between 1928 and 1936 many more trees have moved from the nurseries in Florida; these trees totaling: oranges, 3,600,000; grapefruit, 1,500,000; lemons, 78,000; limes, 237,000; and temples and tangerines, 362,000. In Texas also we find a striking picture. From 1921-22 to the season 1926-27, there was a rapid increase in plantings. By the latter year, the plantings were seven and one-half times those of the first mentioned season. (6) In California also, the new trees being planted are more than enough to replace the normal acreage removals in the case of Valencias. (6)

These two factors, increasing productivity of a great share of the trees, and the ever increasing number of trees, would appear to predict that prospective crops of citrus will be constantly increasing in size, for the next ten years, provided natural forces do not result in low per-acre yields or heavier acreage removals than normal.

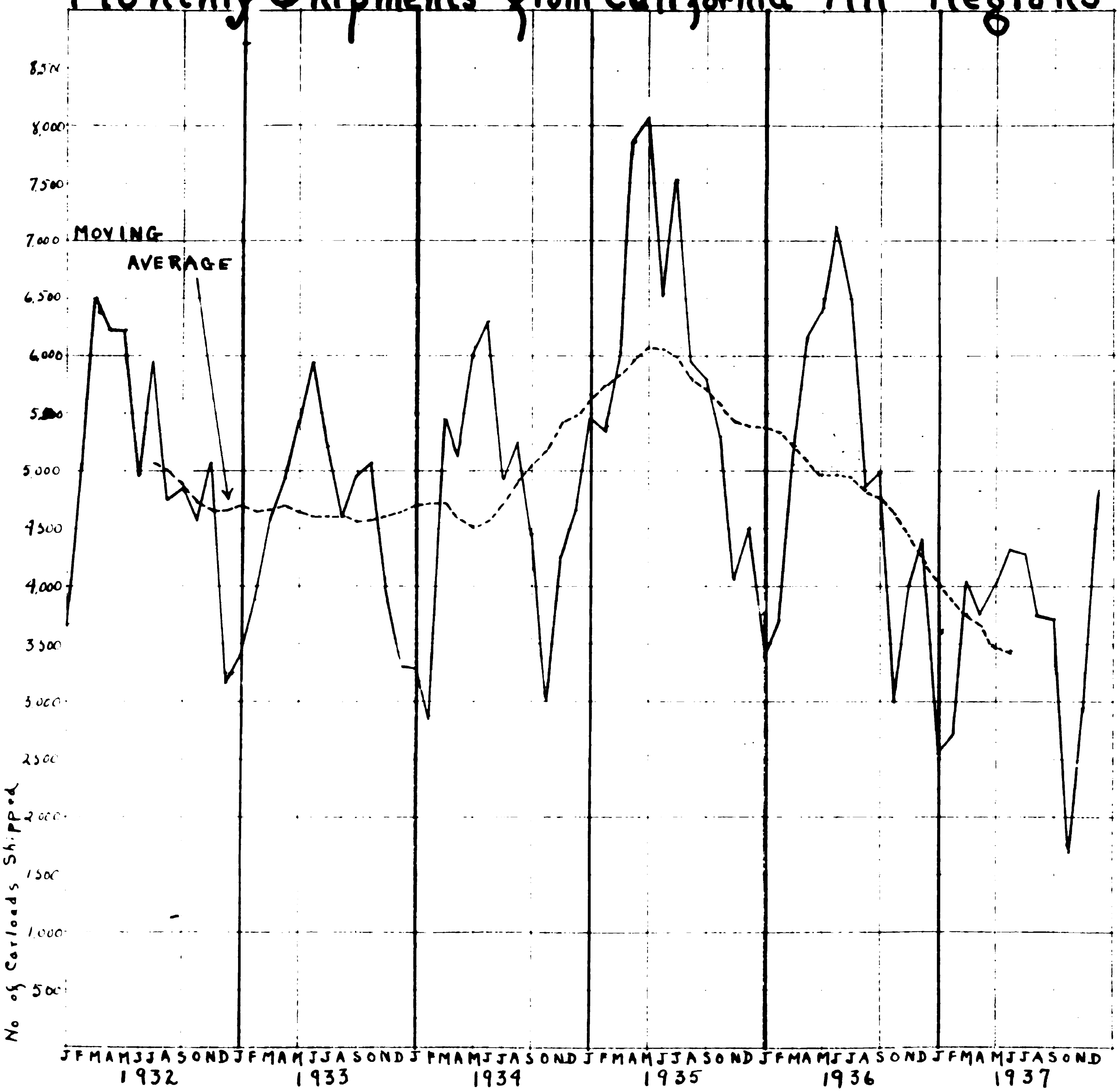
The location of this heavier yield can even be predicted. For oranges, Florida has a higher proportion of younger trees than California. The orchards of Texas and Arizona furnish only a small part of the total crop of oranges, but the larger proportions of the trees in these states are very young. (Table LXXXIII) Therefore, these three states are going to continue to become increasingly important in the orange industry in the next ten years, barring unforeseen unfavorable conditions. The grapefruit industry shows growth in another district. The trees of Florida are the older trees. The young trees are found in Texas, California and Arizona. The crops of these states will become more important in the total grapefruit produced in the next decade. All states appear to be planting more and more tangerine trees. Accordingly, the crop from all regions should be increased.

Analysis of Data Regarding California and Florida Oranges.

Shipments may be analyzed from computations of several kinds. One of the methods of contrasting the shipments of oranges from the two leading producing states is to plot the moving averages. This method gives a more accurate trend than the straight line trend. Graph XXXV presents the trend by this method for the combined shipments from all regions of California. High point of this moving average was reached in May 1935, and it has been in a downward direction since. While Florida shipments reached temporary highs in October, 1933 and July, 1934, it shows an upward slant from July, 1935 to the last computed average, at which time it reached its maximum.

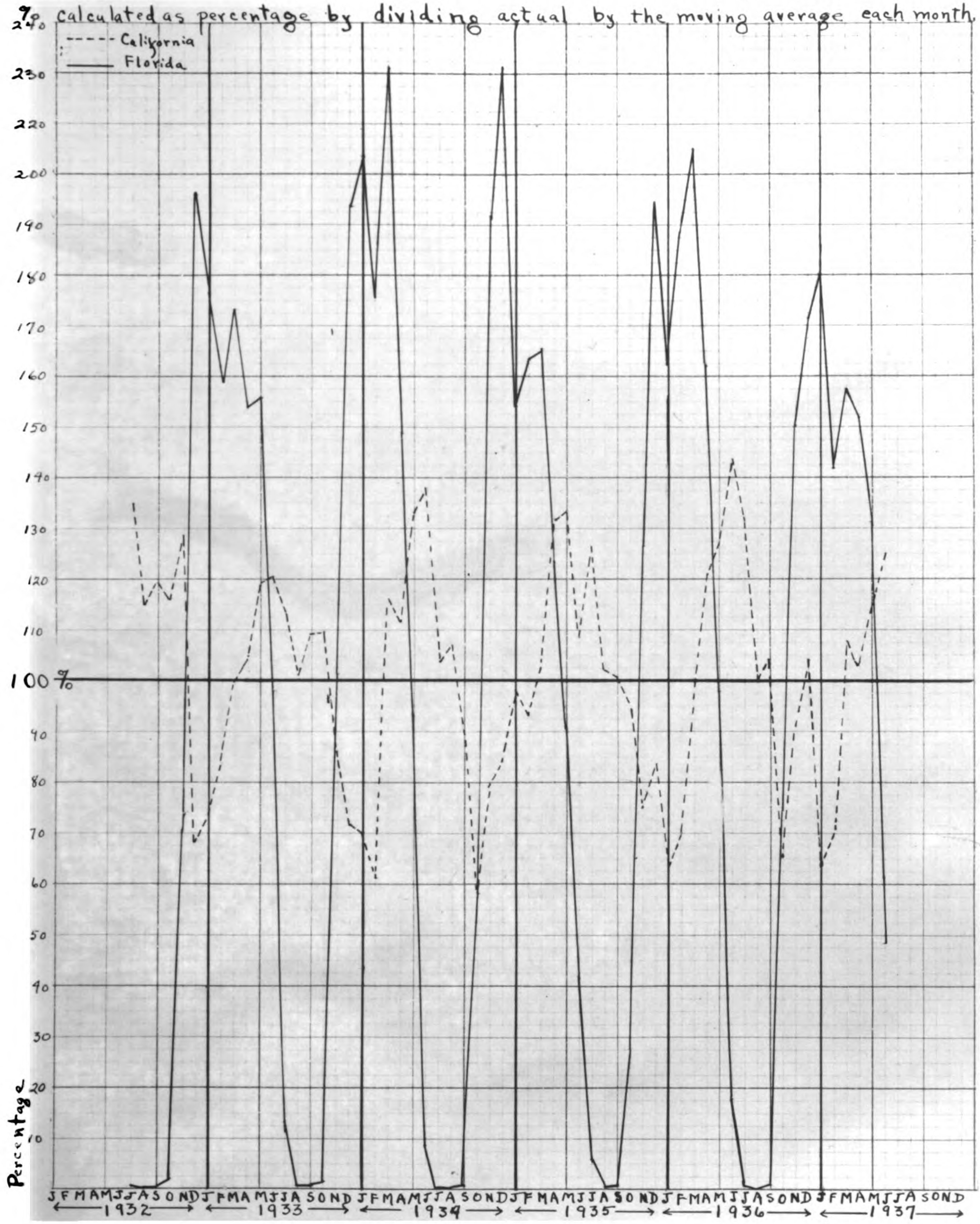
Data with trend removed for oranges from these two states have been computed by calculating the actual shipments as a percentage of the moving average for that particular month. This method removes the trend factor from the picture. Graph XXXVI indicates these percentages have extreme variations. Florida shipments reach high points for months December to May inclusive, and dwindle to nothing for the summer months. Cal-

Graph XXXV
Oranges
Monthly Shipments from California — All Regions



Graph XXXVI

Seasonal Variations of Oranges from California and Florida



ifornia shipments show a different story. The variations are not as great, thus showing that the shipments are more steady. However, fluctuations do show definite seasonal highs, occurring in summer months, especially May and June, and low points when the shipments from Florida are greatest.

Seasonal variations were computed to get a picture of the sizes of the crops each month of the year. This was accomplished by removing trend, and the method used was to take the values for all Januarys in the data for the trend removed, and averaging these numbers, and similarly for each of the successive months. These values were corrected to make the total 1200%. The Graph XXXVII shows, therefore, the seasonal variations with trend removed. California has variation to a lesser extent, due to several reasons. The various districts are computed together, and their seasons differ so that a year round crop leaves that state. Had the districts of California been computed separately, seasonals would have been more nearly similar to the Florida seasonal. The height of the California season is noticed to be in May or June. Florida seasonals show that the winter months furnish most of the fruit from that state, with high levels from December to March. The summer months show almost no crops.

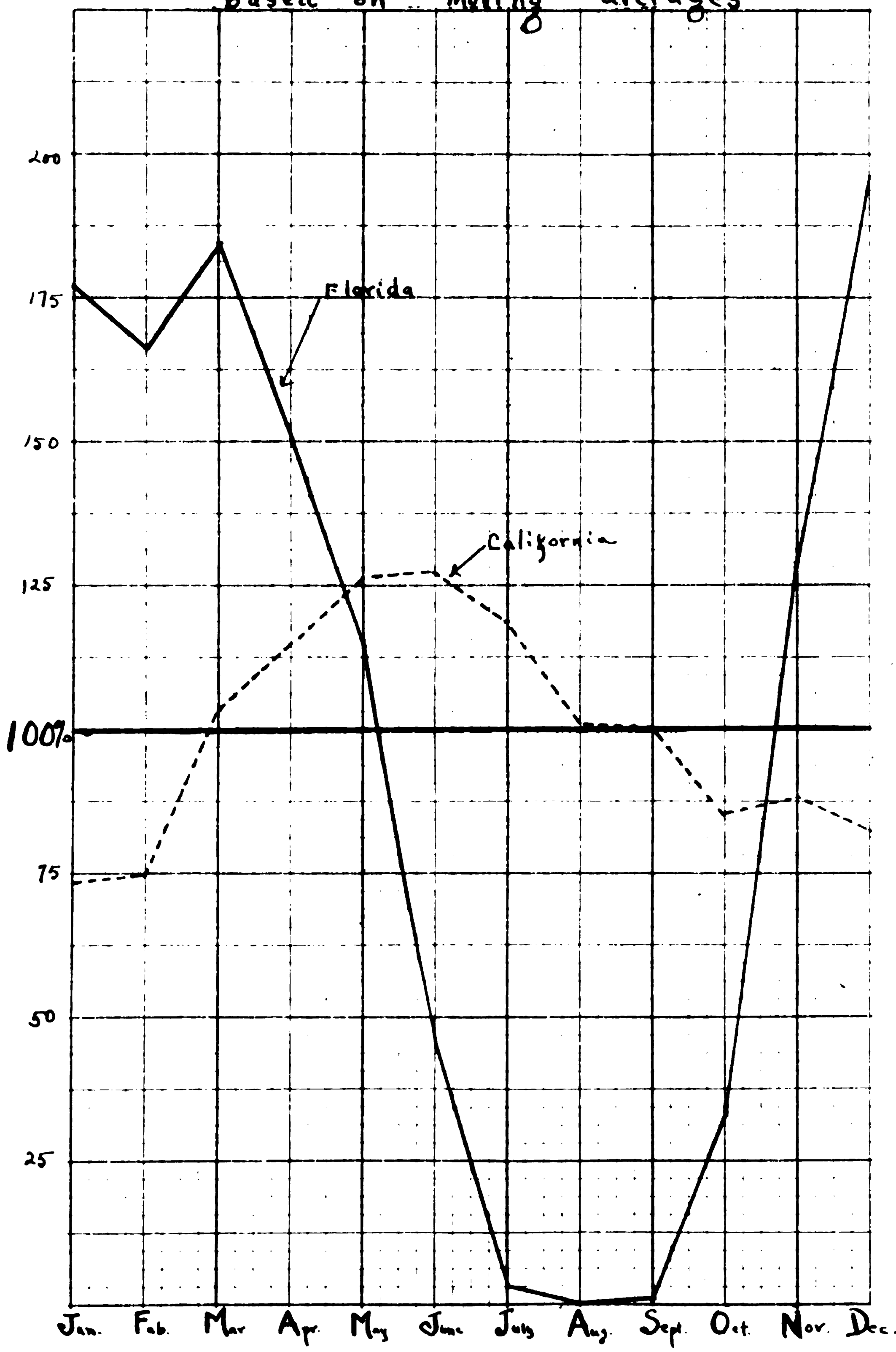
Further analysis can be made by removing seasonal variations along with trends, and plotting the cyclic fluctuations together with residual errors. Graph XXXVIII shows the cycles for the state of California, while Graph XXXIX represents the cycles for Florida with the California cycles superimposed upon it

Graph XXXVII

Seasonal Indexes

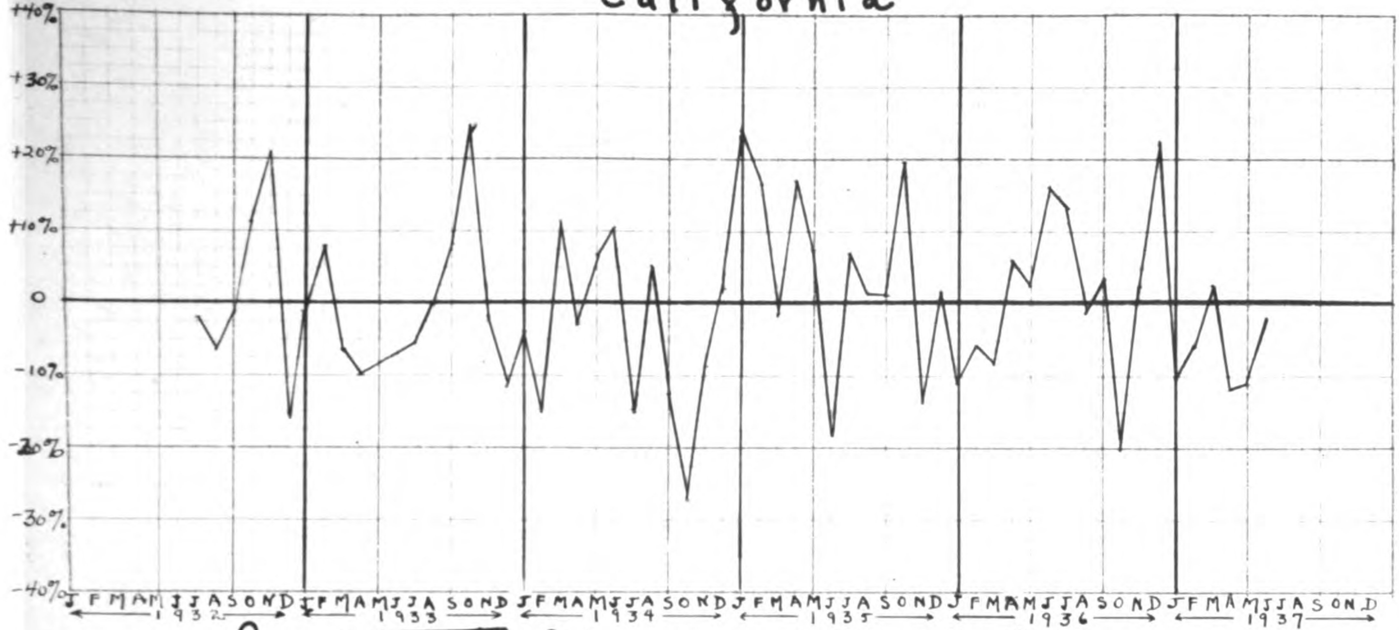
Pretaining to Shipments of Oranges from California and Florida

based on moving averages

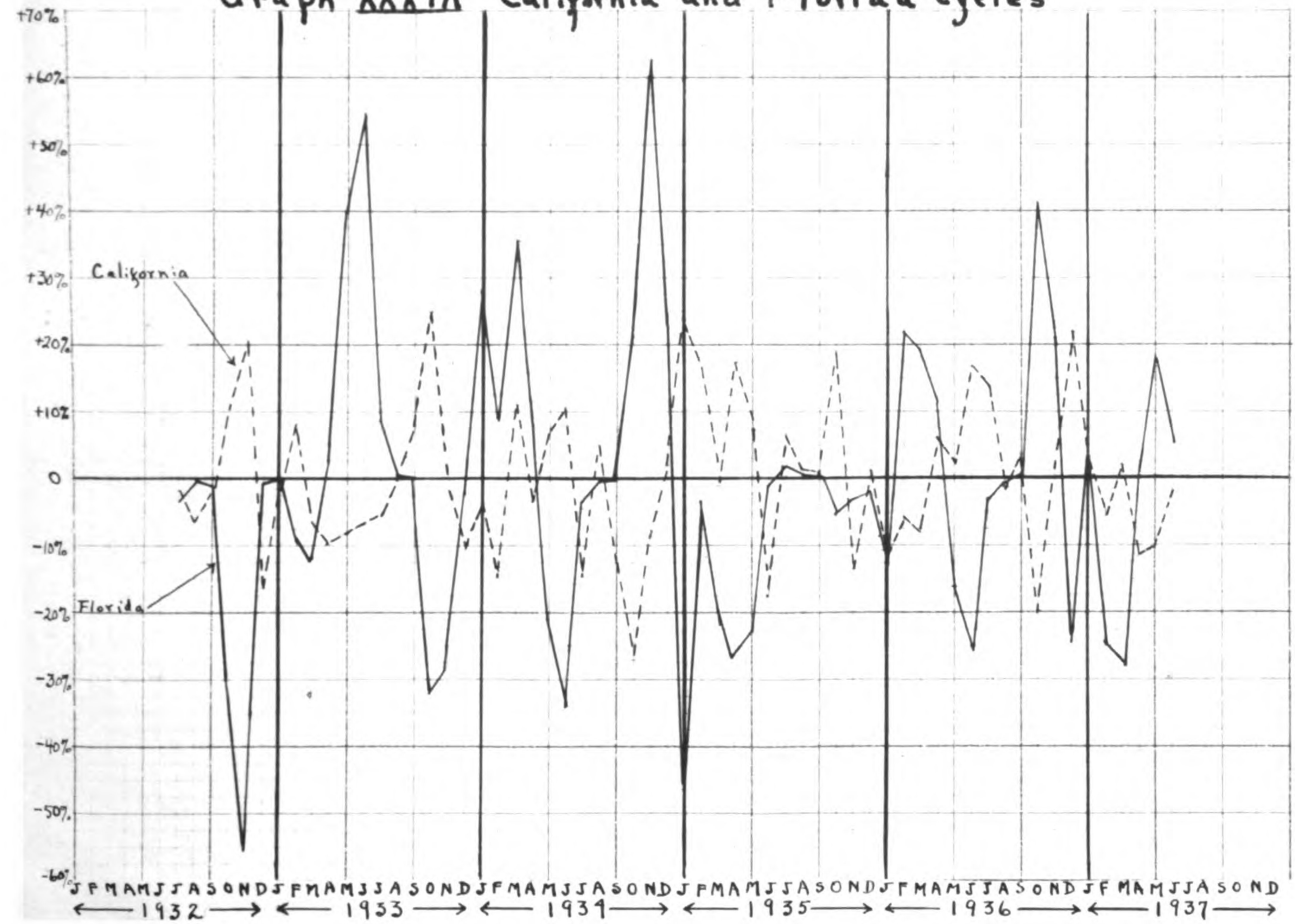


Graph XXXVIII

Cyclic Fluctuations with trend and seasons removed
Oranges
California



Graph XXXIX California and Florida Cycles



with dotted lines. The fluctuation about the zero line is much more pronounced in Florida than in California. The data seem to be in opposite direction for the two states; for example, in November 1932, Florida figures were low while California figures were high. December figures for Florida were high compared with low figures for California. The figures for October, 1935, for Florida were low while they were high for California. In most cases it is found that when California figures are low, Florida figures are high. (This is the reasonable thing to expect, because of the variations in seasons, and because of the fact that if Florida can supply cheaper fruit it will push the more expensive fruit from the market.) Cycles (the distance from one high to another, or one low to another) appear to be of the same size. Time between the extremes average about the same duration, although the amount of variation does not always coincide.

The lag of California behind Florida for highs and for lows is from two to four months, with an average of three months.

Analysis of Data Regarding Florida and Texas Grapefruit.

Moving averages were computed for grapefruit from Florida and Texas. Florida shipments (Graph XXIV) give high averages for July and August, 1933, January and February, 1935, and the highest point in the winter of 1937. This latter high was due to the huge shipments of 1937. Texas shipments produce a moving average which was fairly steady from 1932 to 1936 (Graph XXIII). This average went upward to a new unprecedented level during the winter of 1936-37.

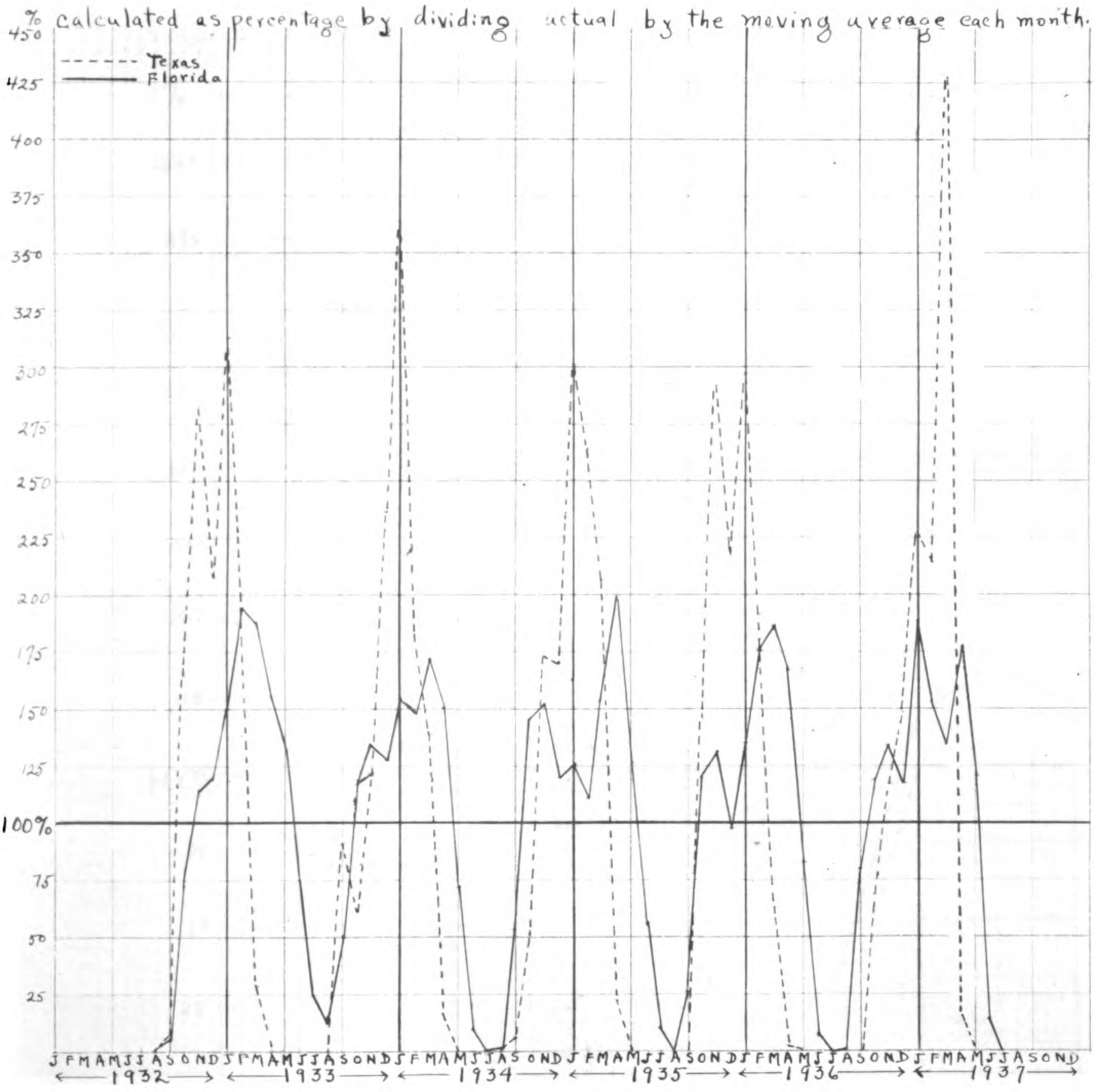
Data with trend removed for grapefruit from these two states have been computed from the relation of actual shipments to the moving averages. So, with trend removed, Graph XL gives a comparison of seasonal cycles and residual error. Florida fruit may precede the Texas fruit on the market, but this is not always true. The shipments from Florida are large during November through May. Shipments from Texas reach maximum levels during December through February, and usually attain the peak in January of each year. In the year 1937 this most phenomenal peak occurred in March.

Data with trend removed for grapefruit from the states of Florida and Texas show us the crop seasons. Graph XLI. Texas shipments appear to reach the high in January, with other high values in November, December, February and March. In other words, Texas has a five-month grapefruit season. Florida grapefruit appear the same months in quantities, with the highest point following just after the Texas fruit disappear from the market, the month of May.

Upon removing both trend and seasonal variations, cyclic fluctuations for these shipments were obtained. These are represented on Graph XLII with Texas cycles shown in dotted lines, and Florida cycles given in solid lines superimposed. Fluctuations in Texas shipments are rather large, especially so in 1937. Peaks are ten, four, thirteen, nine and sixteen months apart. No peak is found in 1936, probably due to the

Graph XL

Seasonal Variations of Grapefruit from Florida and Texas

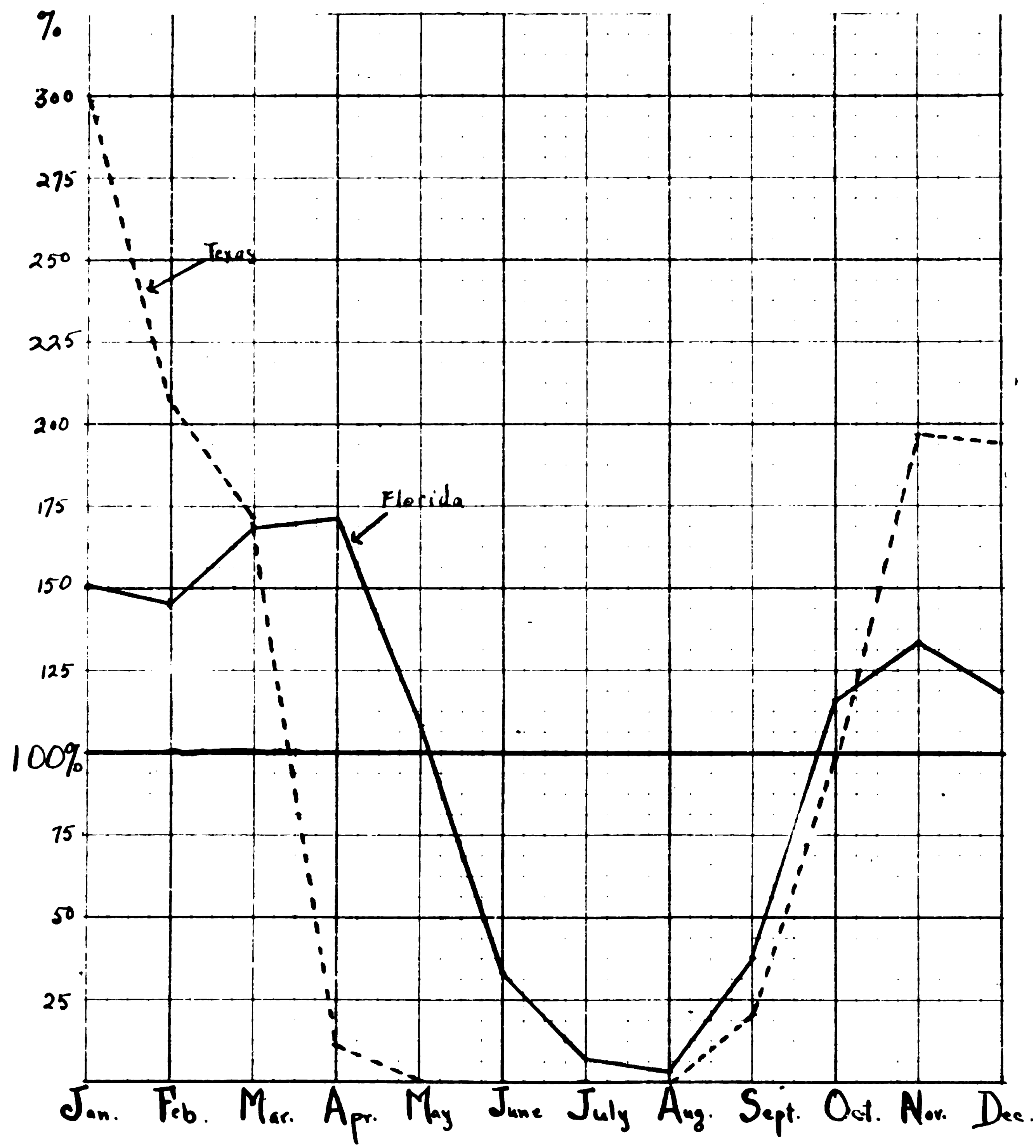


Graph XLI

Seasonal Indexes

Pretaining to Shipments of Grapefruit from Florida and Texas

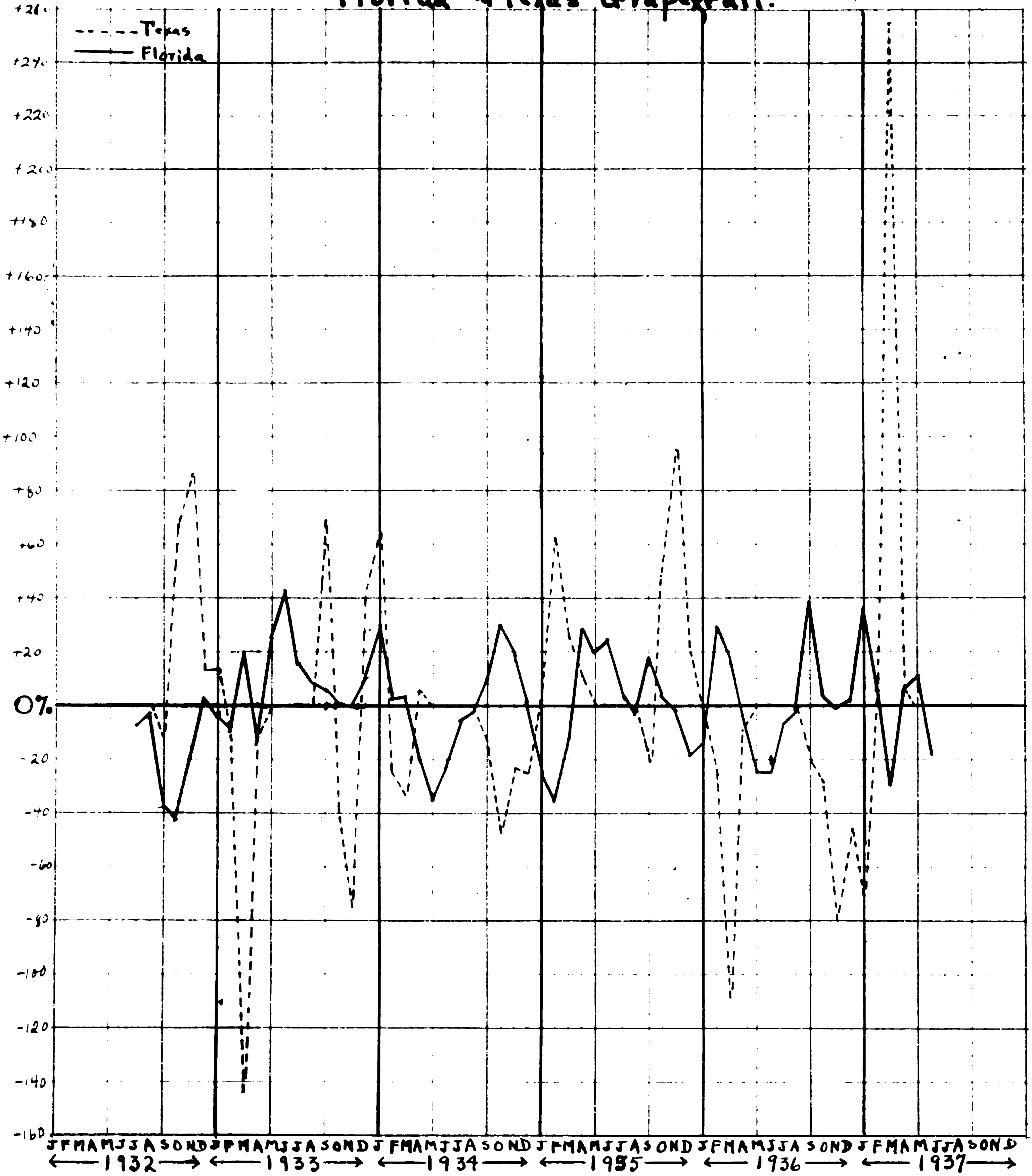
based on moving averages



Graph XLII

Cyclic Fluctuations with trend and seasons removed

Florida and Texas Grapefruit.



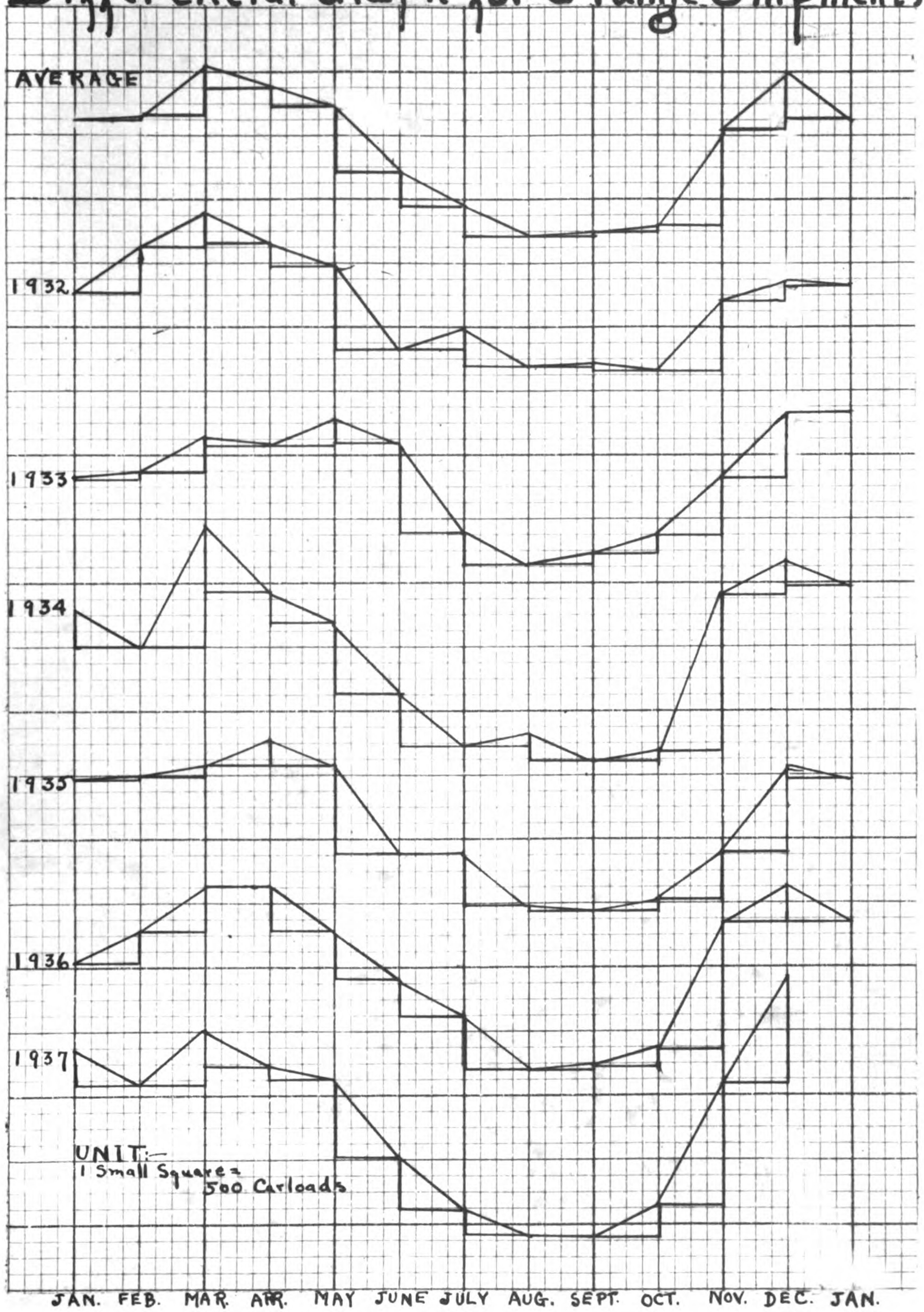
moving average having been greatly increased by the inclusion of the large shipments of the first part of the following year. Low points for Texas occur at distances of eight, eleven, eleven, six, and ten months. This produces an average cycle of about ten months.

Florida cycles are not so pronounced, as the shipments from this state have been fairly steady. However, peaks occur at intervals of seven, nine, six, ten, seven and four months, while lows occur at intervals of seven, thirteen, nine, ten, five and nine months. These cyclic extremes therefore happen at an average interval of seven to eight months. From a study of these seasonals and cycles the student of the markets is aided in predicting the future.

Another method of predictions is included, based upon the differential scheme. In Graphs XLIII, XLIV, XLV and XLVI, each monthly shipment is represented along with the ordinate and abscissa of that point in reference to the preceding monthly shipment. The shipments for the different years and the average thereof, are placedone above the other so that corresponding months appear in the same vertical column. Readings are taken by reading the ordinate of any point above or below the preceding point in order to see the differential in the monthly period. In using this graph, it is wise to cover all exeept the one vertical column which is tò be scrutinized at that time. For example, if the shipments for March are desired for oranges, on Graph XLIII cover all except the February and March values

Graph XLIII

Differential Graph for Orange Shipments

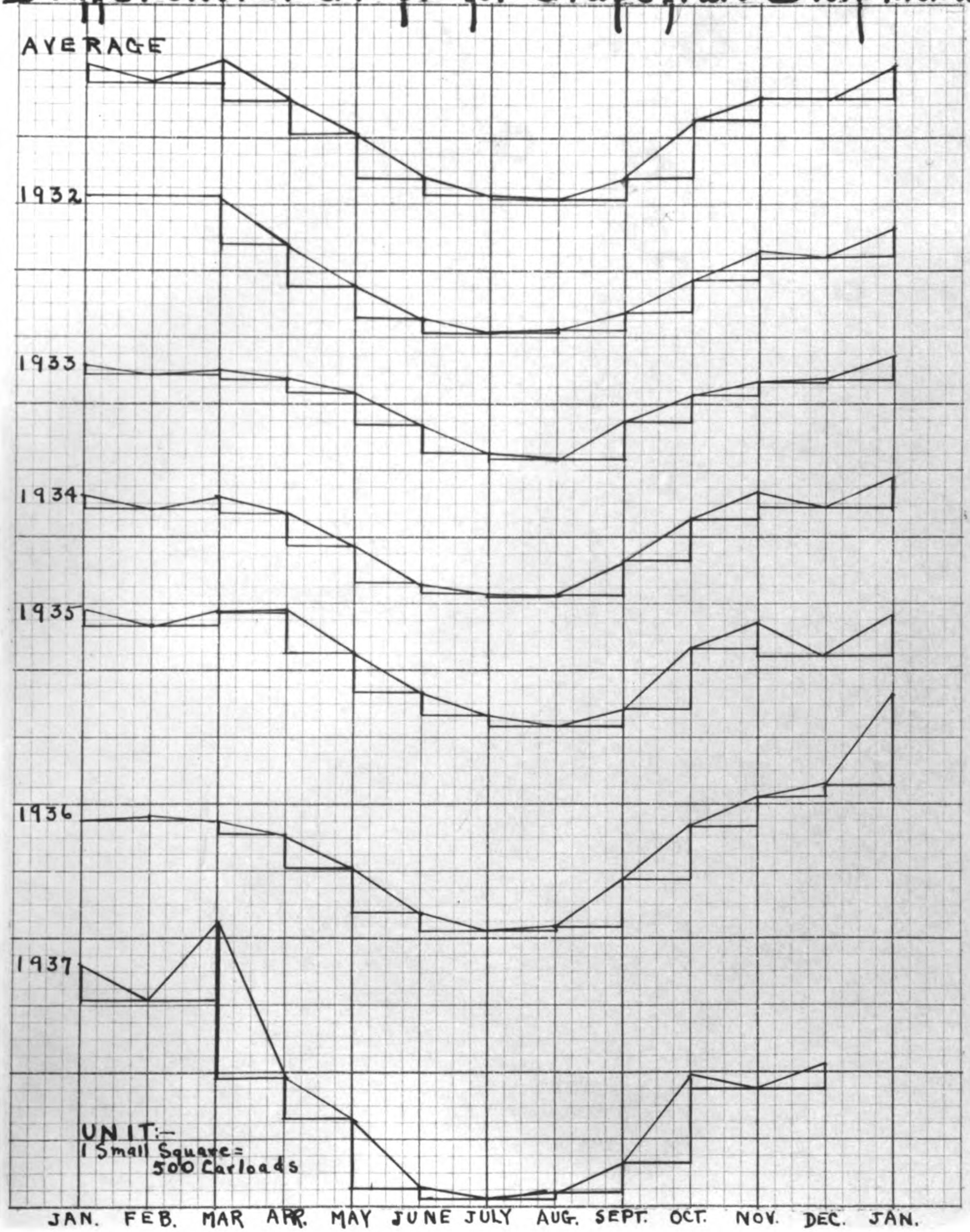


and the intervening column. From the average differential given in the top horizontal row, it will be noticed that March shipments average about three spaces or 1,500 carloads above average shipments for February. The average alone may not tell enough for predictions. Therefore, it is wise to look at the pictures of the separate years. Upon scanning the vertical column for the February-March interval, it will be noticed that each of the six years did show an increase of shipments in March over that of February, and that the extremes of the increases were from about two-thirds of a space or three hundred carloads in 1935, to the highest which occurred in 1934 and was about seven and one-half spaces or 3,500 carloads. It may also be wise to notice the trend of that increase, along with the latest figure which is given in the bottom row. There has been no steady enlargement of that increase, and the amount in 1937 was close to that of the average. Therefore, the average does present an amount that might be anticipated for the next year. Thus, whenever the total shipments for February are known, the average differential can be added to it, and the result will represent a prediction for the following March.

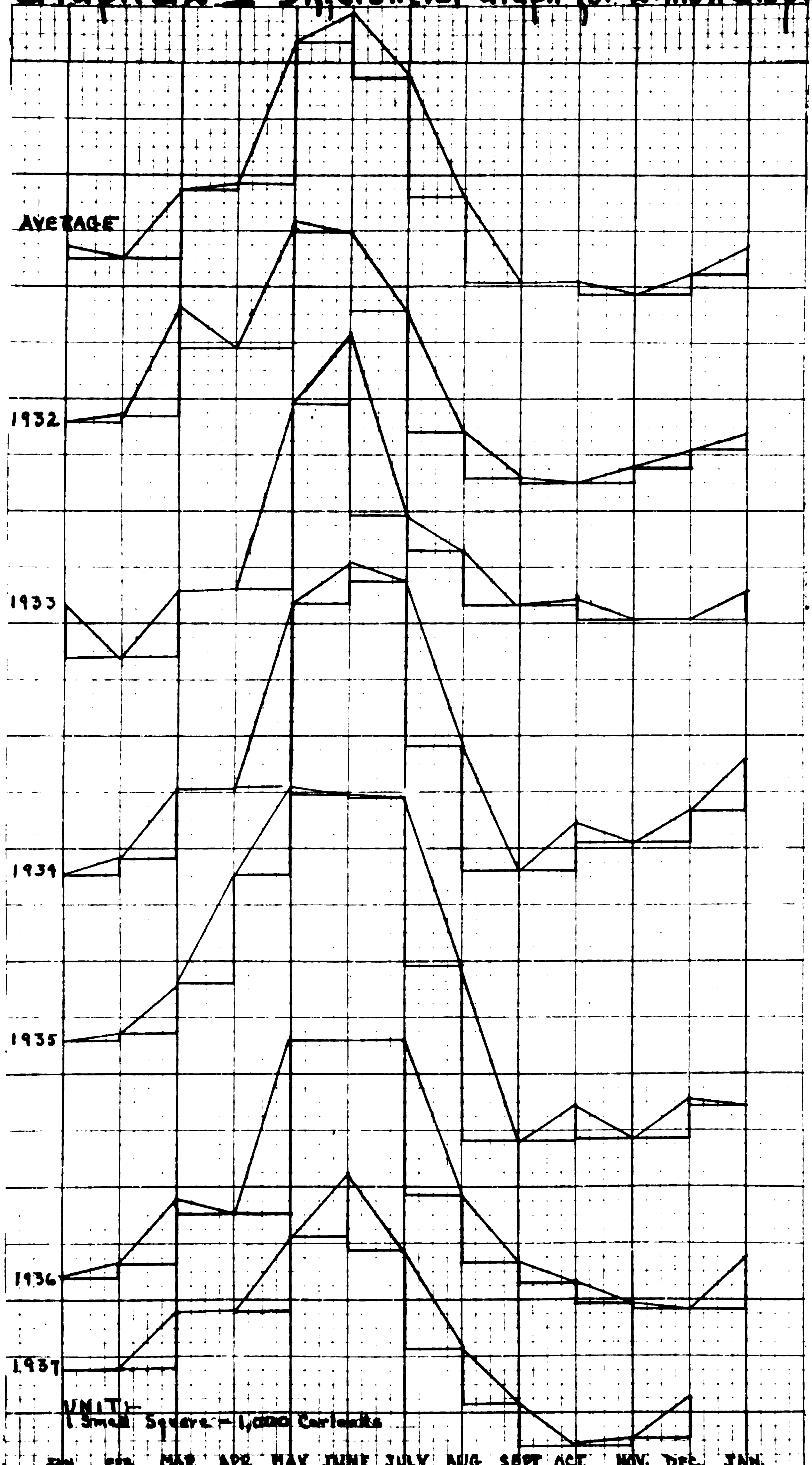
In most cases the average differential graph does show the same tendency in each interval as is presented in the individual yearly graphs. However, that is not true for the grapefruit shipments. In Graph XLIV, for the February-March interval, the advisability of searching the vertical column is shown. The average would show that the March shipments would

Graph XLIV

Differential Graph for Grapefruit Shipments

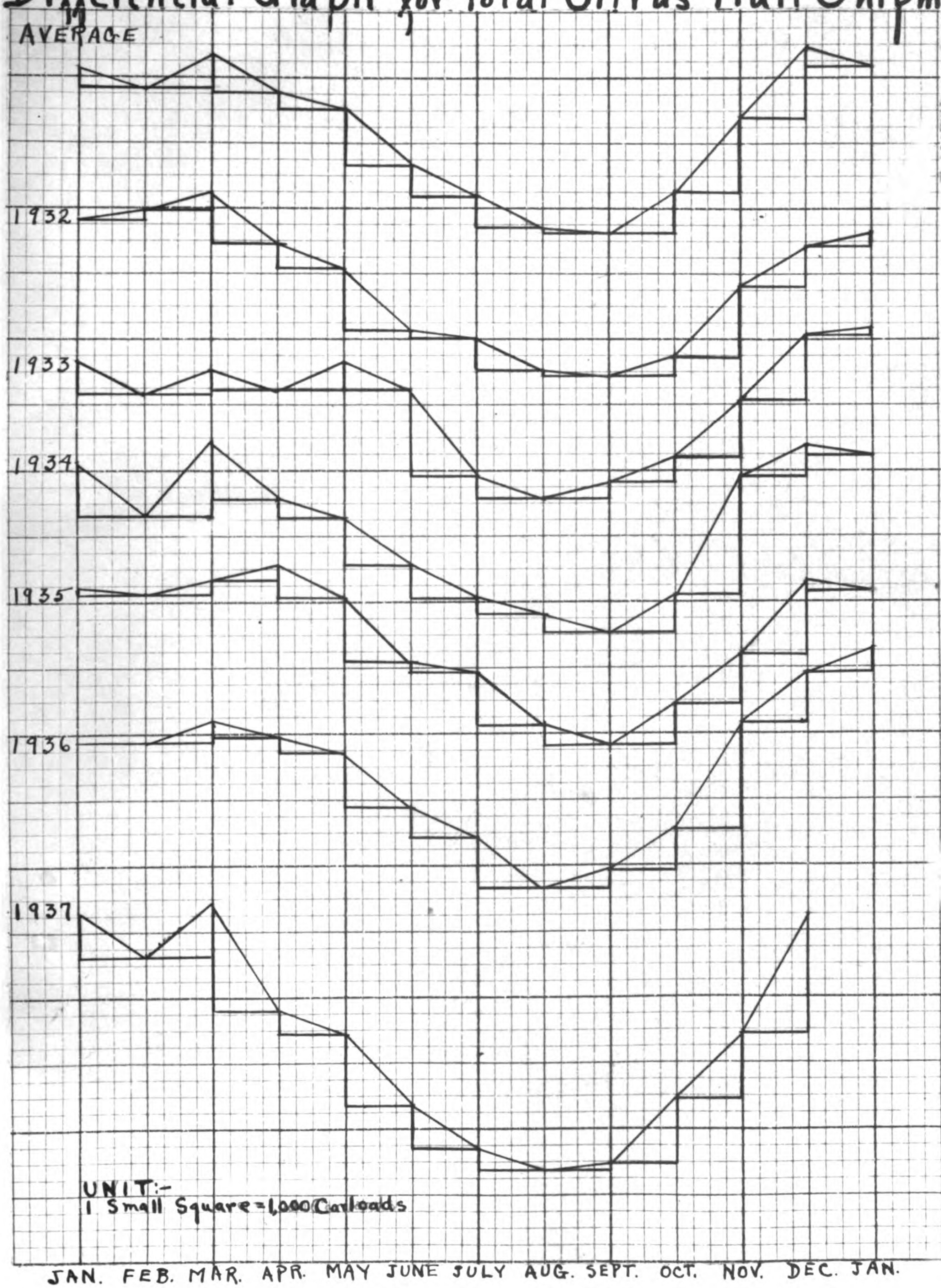


Graph XLV Differential Graph for Lemon Shipments



Graph XLVI

Differential Graph for Total Citrus Fruit Shipments



be one and one-half spaces or 750 carloads above the February total. But the separate values show that the shipments have during that month, increased, decreased and stayed level. Perhaps in this case, the latest figure would be the most valuable criteria for judging future shipments, for it is this large increase which caused the average to be positive.

In spite of the large seasonal variations, and the changing climatic conditions, by using all of these methods the student of the market has some criteria for judging the future shipments of fruits.

C. Distribution of Citrus Fruits.

1. Methods of Distribution.

a. Picking, Handling, Packaging the Citrus Fruits.

As the citrus industry keeps increasing in volume, the methods of handling the enormous amount of fruit become more modern and efficient. Buyers are interested in fruit handling from the beginning, as each thing that is done to the fruit affects first, the quality; and second, the cost of the fruit to the consumer. The harvesting and marketing of the citrus may be done by the owner himself, under his supervision, or by the personnel of a packing house or cooperative organization in the neighborhood. In either case the methods used are essentially the same.

Before the fruit can be shipped, it must meet the legal standards of maturity set up by the United States Food and Drug Administration, and of the state in which the fruit was grown. The outward appearance of an orange or grapefruit is not indicative of the stage of maturity. A fruit which is still green in color, may be fully mature as to flavor, and also, because of different climatic conditions and characteristics of the fruit itself, another variety may be sour and unripe in spite of the fact that its rind has changed to the expected "ripe" color. Chemical tests of maturity have now been set up in Florida, California, and Texas, whereby the exact stage of maturity can be determined. (Appendix, p. 134) None of the treatments given to fruit to cause the color to be changed, affect the ripening or sweetening of the fruit.

A fruit picked immature will remain so. (22)

Picking must be done by hand, and with clippers in the case of oranges, lemons and tangerines. Care must be taken in clipping. It is important to clip the fruit with very short stems. If a long stem is left attached, there is danger that the other fruits in the package will be injured by the stem. Also, the fruit rind must not be clipped. Clipper cuts are the site of rotting. Snub nosed clippers are being widely used because they avoid much of the injury to rind. Lemons are picked according to size. The lemon is considered large enough when it will just pass through the ring the picker slips on the fruit. (12) After the lemon has reached that stage of maturity, the pulp section does not continue to grow, but only the rind section enlarges.*

Picking is usually paid for by the box. The rate varies with the size of the fruit, the kind of picking desired, as spot-picking, or the entire crop, and the amount of fruit on the tree, as scattered or close. The rate for tangerines is usually double that for grapefruit, and for oranges usually about two-thirds the tangerine rate.

"Pulling" instead of picking is seldom done with tangerines, lemons, or oranges, because of the danger of tearing the skin near the stem. On the other hand, the grapefruit can be pulled during the greater part of the season. It appears to be

*Interview with Dr. Ernest Bessey, Head of the Botany Department and Dean of Graduate School, Michigan State College, East Lansing, Michigan.

a distinct advantage over clipping, as removing the calyx points lessens the liability of stem-end rot. The fruit is placed in a bag, so fixed that the bottom can be opened to discharge the fruit into field boxes. The ordinary day's work is eighty boxes of oranges or one hundred twenty boxes of grapefruit, if trees are well loaded. Some of the more progressive organizations require pickers to wear gloves, to prevent fingernails from injuring the tender skin of the fruit. (22)

Field boxes in which the fruits are hauled to the packing house, are usually slightly larger than the standard orange crates seen on the market, and hold from eighty to one hundred five pounds of fruit. The California field box is smaller than the one used in Florida. Unless the crop is unusually good, it is not possible to secure a packed box of fruit from a standard Florida field box. It is the desire of every packer to do so, and this leads to the practise of overfilling the field boxes. Boxes in this condition, and stacked four high on the trucks, damage the fruit by bruising. (22) Hauling to the packing house is now done mainly by motor truck. It may be necessary to haul the fruit to the edge of the orchard on low-wheeled carts, if the trees are so close together that the truck can not get into the orchard.

The packing houses are now modern plants of efficient planning. The fruit follow a straight line path through the plant, arriving at one end and leaving at the other. Careful checking is necessary to keep the fruit owned by the different customers in lots which will not become confused. Another duty of the supervisor is to decide on the treatment of the fruit which is necessary before packing.

Various forms of rot are liable to attack the citrus fruits after harvest. The stage of maturity and the climatic conditions, temperature and humidity greatly influence the development of the organisms that cause decay. Five forms of rot are common to the citrus fruits; the Penicillium rots, stem-end rot, Colletotrichum rot, brown rot and blossom-end rot.

Penicillium rots are the most common of the above named. These include green mold rot, blue mold rot, blister rot, and pinhead rot. These occur more often during the cooler months, or on fruit held in storage which is cool or cold, for some time. Organisms are air-borne, and are, of course, more abundant where other decaying fruit is near. The green and blue mold rots begin with a small, soft, watery spot, sometimes known as pinhead rot. Upon spreading, a larger spot is sometimes called blister rot. A white mold or fungus growth then appears over the central area of the affected part, and then the spot turns blue or green, according to which organism is causing the rot. Green mold spores develop only on the surface. Blue mold spreads rapidly in packages by contact. The susceptibility of the fruit increases with advancing maturity. Mechanical injury of fruit should be prevented, as a means of warding off Penicillium rot. Sanitary packing houses also reduce the sources of chance infection. (28)

Methods for cleaning and sterilizing packing house equipment and field boxes include scrubbing with pine oil emulsions, subjecting to live steam, or sulphur dioxide fumes, or gassing with Decco gas, (NCl_3). The latter method has been worked out by Leo J. Klotz, recently of Michigan State College, working now at the Riverside Station, Riverside, California. (31) High temperatures used in degreening, render the fruit less susceptible to this rot, but cause the fruit to be more susceptible to stem-end rot. Dipping the fruit in five percent borax solution is also quite effective in preventing the spread, but must be prompt, within six or eight hours after the fruit is picked, to be effective. 31 ~~(29)~~ Chilling the fruit promptly, to a temperature below the optimum for growth of the fungi, is also effective. (22)

Stem-end rot is not so common. It does not form a distinct spot, but there is a softening and decay of the rind and pulp tissue in the stem area. Discoloration does not often appear, but when it occurs, it is buff or slightly darker. The decay advances through the center, and often reaches the blossom end before one-third of the surface is affected. Treatment to prevent this rot includes a bath in eight to ten percent borax solution, careful handling, and refrigeration. (22)

Colletotrichum rot is not usual in occurrence. It is very similar to stem-end rot. Refrigeration is the only known means of retarding its growth, as antiseptics are ineffective.

Brown rot is more common in California. It is detected by a characteristic odor. Control measures consist of soaking the fruit in water held at 120 degrees Fahrenheit, for a period of two or three minutes, and then promptly refrigerating the fruit. (22)

Blossom-end rot occurs very commonly in oranges, but is not often serious. The disease seems to attack the skin, and not much of the flesh decays. Navel oranges are more subject to this disease. No special remedial measure has been developed.

The above shows reasons for the packing house treating the fruit in an antiseptic bath, and refrigerating the fruit as soon as possible. (22)

Another problem of marketing is the color of the fruit. Oranges, especially the Washington Navel, Parson Brown and Satsuma, reach maturity before turning the desired orange color. Valencia oranges develop the orange color before they are mature, and when left on the tree until spring, "regreen" as nature is returning the color element to the trees. (25) Therefore, coloring or degreening is necessary to allow the orange coloring to show. One usual method of doing this is to subject the fruit to gas, either ethylene, or the fumes of burning kerosene. The former is preferred. The time required for this process is from twenty-four hours to one week. Another method is use dye liquid or concentrate, or materials which react to form a dye, to enhance the color of citrus fruit by the addition of artificial color to the peel thereof. The law

in Florida required that each fruit be stamped "Color Added", if this treatment has been used. (22,30)

Frozen fruit is separated from the rest by flotation tanks in some cases. The borax solution can be used in this tank, thereby doing the two jobs at once. (22) In California now fluoroscopes are used to X-Ray the fruit and detect frost damage. (25)

Fruit is cleaned thoroughly be scrubbing. The water in the automatic machines is maintained at about one hundred degrees Fahrenheit. Detergents are used, especially trisodium phosphate, as the results with this solution are gratifying. An interesting incident was called to the attention of the writer. After California adopted the use of automatic washing tanks, making use of flotation of the fruit, Florida fruit men visited and marveled over the new invention. Upon return, a machine was ordered for use in Florida. The machine was unsuccessful there, because the men had forgotten that the Florida fruit is so heavy that it sinks in water. New adaptations of the machine had to be made before success was obtained in Florida*.

Drying must be thorough for polishing to be effective, but more important than polishing is the possibility of decay in damp fruit.

Polishing may be by mechanical means only, producing a natural sheen on the fruit, or by applying paraffin, carnauba

*Interview with Dr. Ernest Bessey.

wax, pine oil, or rosin compounds. It is believed that polishes reduce subsequent wilting of the fruit, retard "aging" effects, and keep the rind with a fresh look. (22)

Grading of fruit is the next step in the process. Graders wear gloves to prevent damaging the fruits. (12) Citrus fruit is graded mainly on the surface appearance of the fruit. The United States Department of Agriculture grades and standards are usually used. These are given in the Appendix.

After grading, sizing is next in order. Machines size and count the fruit. Maximum and minimum diameters for the different sizes of oranges and grapefruit, lemons and tangerines are established. The size indicates the number of fruit necessary to fill a standard container. Fruits in one box must be uniform in size. (Tables CX, CXI, Charts V, VI, VII)

The number of oranges in a crate varies from 96 to 344. The average size oranges pack 126 to 216 to the crate. Grapefruit require 28 to 96 to a crate, common sizes being 46, 54, 64, 72, and 80 to the crate. (6) Lemons go to market packed 240, 270, 300, 432, 490 and 540 to the box. (25) Tangerines, Mandarins and Satsumas are usually packed in half boxes or "straps", and graded according to number as 48's to 216's. (26)

Packaging is an important step in producing a satisfactory articles which can travel for great distances to the ultimate destination. Fruits must keep their original position in the box. Loose fruit would be damaged by bruising.

Various containers are used. The Florida box is the most common in Florida, while the California box is the usual

Chart V

Diameters of Oranges from California

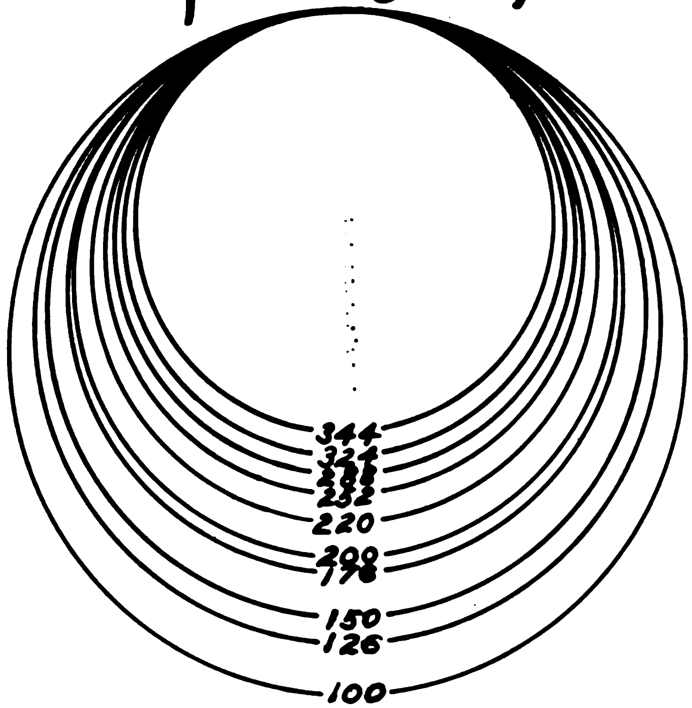


Chart VI

Diameters of Oranges from Florida

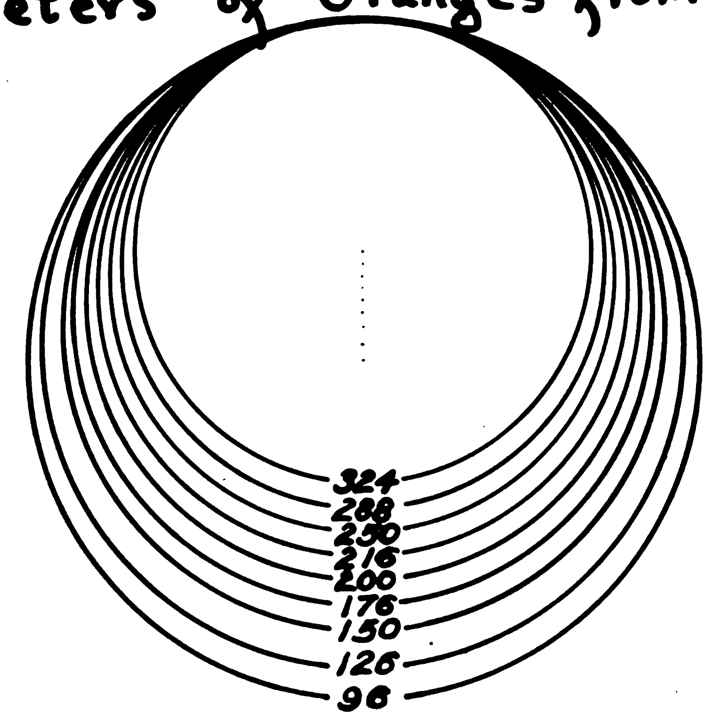


Chart VII
Diameters of Grapefruit from Florida and Texas

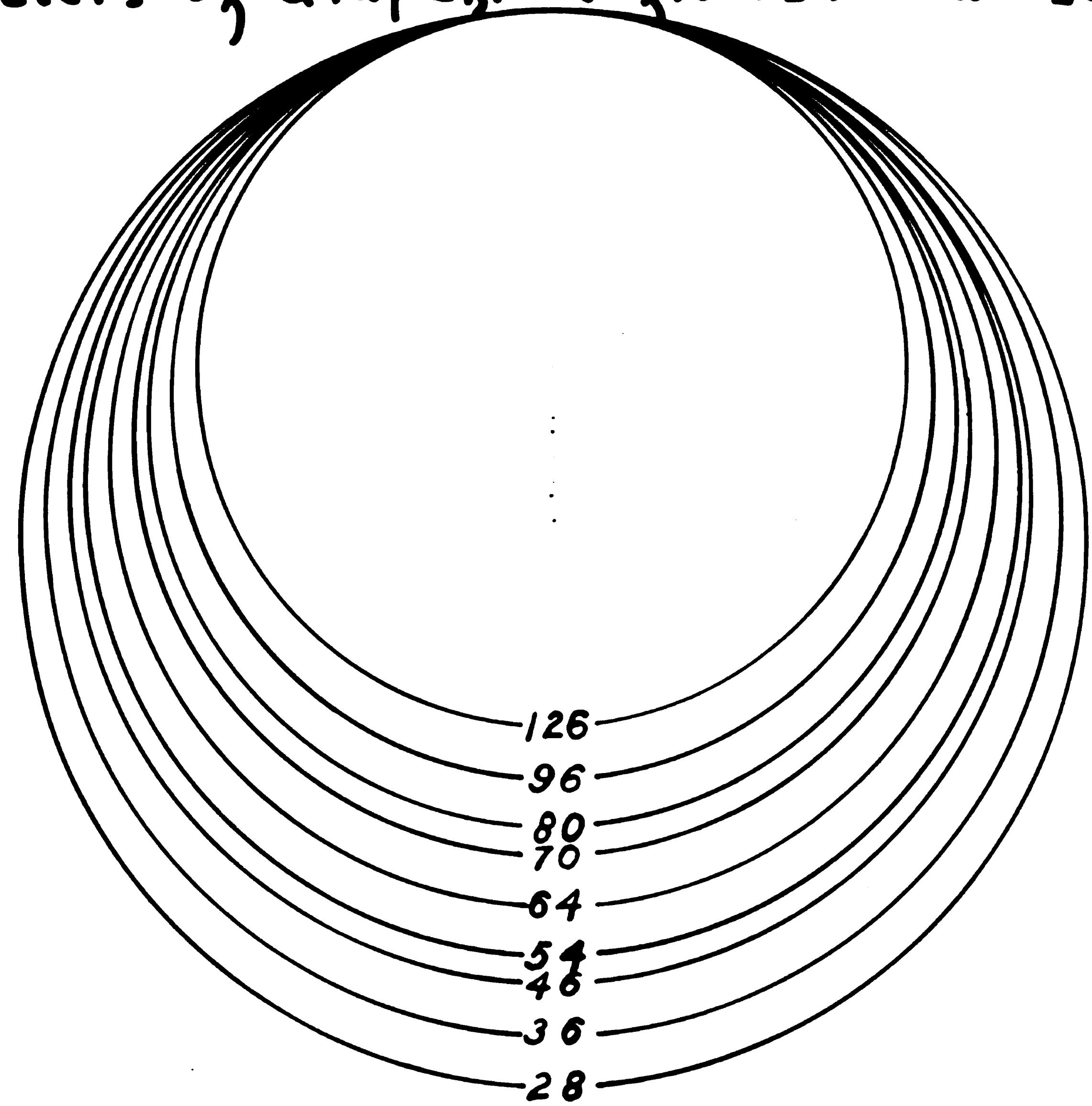
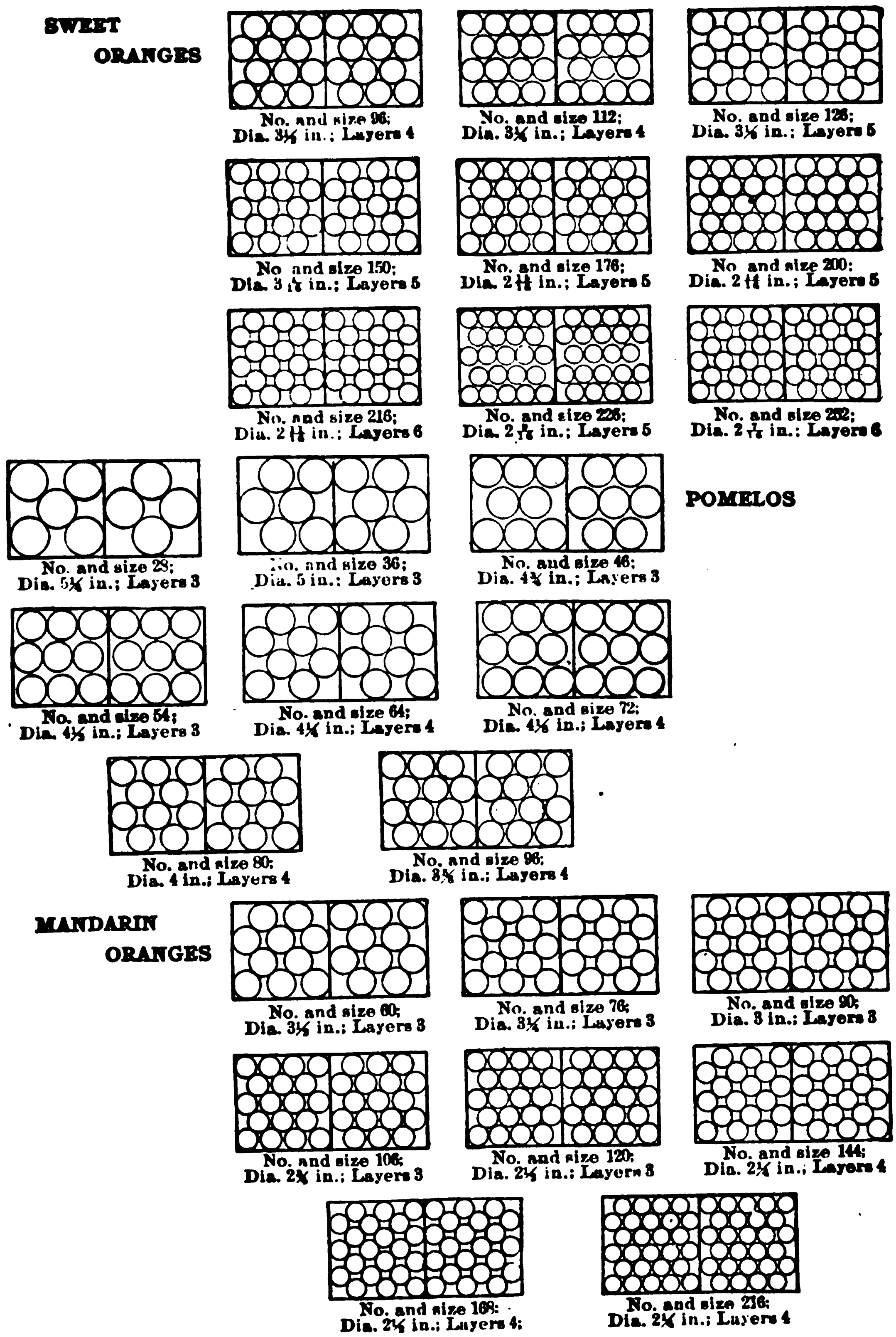


Chart VIII

Method of Packing Fruits



—Method of Packing Var'ous Sizes of Citrus Fruits. From Cultivation of Citrus Fruits, by H. H. Hume.
—By Permission of The Macmillan Company.

one in that state. The Florida box has a capacity of 1.60 bushels. The inside dimensions are: length, 24 inches; width, 12 inches; depth, 12 inches. The California box has a capacity of 1.47 bushels, and the inside dimensions are 24 by $11\frac{1}{2}$ by $11\frac{1}{2}$ inches. Texas uses both the California and the Florida boxes. The half boxes hold .8 bushel, and are known as "half straps", as two are often strapped together for shipping. These boxes are the length and width of the other boxes, but are only six inches deep. A small box, with a capacity of .8 bushel, but having dimensions $9\frac{1}{2}$ by $9\frac{1}{2}$ by 19-1/8 inches, is often used for small oranges and tangerines. Bushel boxes, cylindrical crates with slatted sides and wired crates are economical crates often used. Open mesh bags, with capacity of 40, 8, and 5 pounds are now being used. This is an economical package, but not satisfactory for long distance shipments. (Appendix)

Wrapping in tissues is next in order. This wrapping is not always done when packing in standard Florida boxes. If fruits are wrapped, it is usual to wrap each fruit. However, there is a pack known as "blind pack" in which case only those fruits in the top and bottom layers and those that are visible through the open spaces in the box are wrapped. This is often used for oranges of size 250 or less.

The paper used is tissue, and it is ordinarily slightly oiled, making it easier to work, and somewhat tougher than common tissue paper. The amount of paper needed to pack

varies with the size of the fruit. On an average, about forty reams of paper are required for each one hundred boxes of oranges or tangerines and about twenty reams for a like number of grapefruit boxes. Sizes of the individual papers for various sizes of fruit are shown in table on page 280 . (22)

The shippers are very particular about the wrapping. If advertising appears on the wrappers, as it often does, the top layer must show the advertisement on each fruit. No "flags" or loose ends are allowed to show through the open slots. A tight twist is demanded in some packing houses for the entire pack. Some twist only the top layer and these touching the open spaces of the box, and allow the others to be "wadded". The latter requires much less time.

The top is nailed on, and a metal strap fastened across the center of the top. They are then stacked four high on their sides, to prevent pressure on the top. When packing, the bulge on the top varies, in the case of oranges from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches, and for grapefruit 2 to 3 inches, measured above the sides. If the bulge is less than the minimum, a "slack pack" is apt to result before the fruit reaches its destination, and cause bruising. Too high a bulge will also cause bruising, through heavy pressure within the package. Florida boxes, instead of tops being nailed on, have them fastened by wires, usually five, around the case.

Precooling is being practised in many packing houses. As has been stated, growth of decay organisms are thus retarded.

b. Transportation of Citrus Fruits.

The principal methods of transporting fruits for great distances are by rail, water, and motor truck. Much of the transportation is a combination of two of these methods, as fruits are taken to the ocean by motor or rail, and then the remainder of the distance by water. Better methods of refrigeration on shipboard is one reason for increased popularity of this kind of shipment. Between 1930-31 and 1932-33, the boat shipments increased from a fraction of a percent to 57.4% of the New York receipts. (28) This was attributed somewhat to lowered prices for fruit in 1932-33 and to the fact that cheaper modes of transportation were therefore used.

The exact extent of the boat shipments cannot be judged from the figures compiled by the United States Department of Agriculture, as these are included in the carlots after being reduced to a similar figure. Truck shipments can be studied, however, as they are listed separately. The number of truck loads translated into carload equivalents increased from 1,799 in 1932, to 20,230 in 1937. The compiling agency does not claim these figures to be complete, as it is impossible for the truck shipments to be exactly recorded. Therefore, it is very evident that the truck shipments are playing an important part in the movement of citrus fruits to the market. This is especially true of Florida and Texas fruits going to northern markets.

Preservation of the fruit while in transit may be done in either of several ways or a combination of two of these.

In a study of Florida citrus prices, Spurlock and Brooker found that the following methods were used in 1930-33: pre-cooled; initially iced; pre-cooled and initially iced; precooled and standard refrigeration; standard refrigeration; standard ventilation. Pre-cooled consists of placing the fruit in refrigerators at the packing house and cooling the fruit before it begins shipment. Initially iced consists of using refrigerator cars which must be provided with ice as a means of cooling. Standard refrigeration is the method whereby cars are cooled by automatic mechanical refrigeration. Standard ventilation involves no refrigeration of any type. Of these, the most popular method was to pre-cool and initially ice the fruit or use standard refrigeration in the hotter months from May to October, and to use standard ventilation only (no refrigeration) in the cooler months, November to April. (28)

c. Distribution Agencies.

The owner of citrus crops may market the products independently, packing, shipping and selling the products as he sees fit, or he may have this function performed for him by any one of several organizations. Numerous marketing agencies are available to these growers.

There are independently owned shipping agencies located throughout the citrus areas which will harvest, pack, and market the fruit. Cooperative organizations are functioning for this same purpose. Several outstanding examples of these are

now operating in each state.

In Florida, the Florida Citrus Exchange, with headquarters at Tampa, Florida, is a grower's cooperative marketing organization. This was organized in 1909. Its membership is composed of about one hundred twenty-five local associations including five or six thousand growers. This agency handles approximately one-third of the citrus crop of Florida. This organization takes complete charge of the fruit of all of its growers, gathers it from the trees, packs and markets the fruit, and charges the owner a stipulated price per box, while the independent shippers buy the fruit on the tree, or delivered at the shipping point. (6)

In 1928, another group of citrus shippers in Florida organized the Florida Citrus Growers Clearing House Association, the headquarters of which is in Winter Haven, Florida. Their purpose, as set forth in their charter, is to "better promote the general interest of Florida citrus growers: (1) By improving the quality, grade and pack; (2) by promoting a wider distribution of the volume of Florida citrus fruit through advertising, through more equitable freight rates, and through economic refrigeration; (3) by securing and stabilizing a systematic flow of Florida citrus fruit from producers to consumers as efficiently and directly as possible." (6)

In 1935, the Legislature established the Citrus Commission. The duties of this group were to take charge of packing, shipping, and advertising of citrus fruits. These laws were reenacted by the Legislature of 1937. (30). Inspection service is carried out by the Commissioner of Agriculture under the direction of the Citrus Commission created by the last named law. Proper grading, adjustment of juice requirements and collection of fees per box to create a fund for advertising fruits in various parts of the United States, were all measures included in the powers of the Commission.

The Federal government has set up a board to assist in regulating shipments. This board works with the Florida Commission to allocate shipments. (6)

California has one of the most widely known cooperatives in the entire world, the California Fruit Growers Exchange. This organization has been mentioned previously, but deserves discussion as the outstanding marketing agency for citrus fruits.

The organization of this group consists of three main divisions: (1) the local associations; (2) the district exchanges; and (3) the California Fruit Growers Exchange. The services rendered by each of these divisions are different.

The local associations may perform many and varied functions, at the discretion of the individual groups. Many supervise the pruning and look after the fumigating of the orchards. Most of the locals set the time for picking the fruit, set the amount to be picked, and actually supervise the picking. In practically all cases, the local organization sorts, packs, and grades the member's fruit, and has the authority to sell the fruit. Each local establishes a grade pool, and sets up labeling under its own brand name. However, if it choses to use the

"Sunkist" and "Red Ball" labels which belong to the association as a whole,- on fruit which comes up to the required standard, it may do so.

The district exchanges have a number of functions. Usually the fruit ready for sale from the local organizations is actually sold by the district exchange. Cars are ordered through this medium. Monetary returns are transferred to the locals upon receipt from the California Fruit Growers' Exchange.

The functions performed by the central exchange included a host of important services. Through collection of data and research carried on by its own trained scientists, it tries to educate the fruit growers regarding the most profitable methods of production and marketing. It handles the money from actual sale of the fruit, and returns the same to the grower. It carries on inspection of fruits while enroute, and at the point of final destination. It assembles and dispenses information as to the markets, demand, prices, and movement of the fruits from its own and other sources. It attends to all legal matters arising from marketing or transportation. It establishes sales agencies in the principal cities of the country. The one nearest East Lansing is located at Grand Rapids. And, as one of the most important services to the group at large, it advertises citrus fruits extensively, trying to create an increased demand for the products. (33,34)

Texas has lately established a Citrus Commission similar to Florida's, with authority over maturity and grading and method of securing revenue for support.

d. Methods of Sale.

Upon arrival of the fruit at the terminal where final wholesale selling is to be done, the fruit may be sold either at private sale or at auction. In 1938, the California Fruit Growers' Exchange sold carloads of fruit to 1,800 customers at private sale, as well as using the auctions in 10 cities (21).

In the twelve leading cities of the United States, regular produce auctions are held. In 1937, the auction sales of fruits and vegetables by fourteen companies totaled 102,128 cars. Of these, 61.9% consisted of citrus fruit. (35)

Auctions are usually held on a pier or at railroad freight shed. Unpacked and separated into lots, the goods are placed so that they can be inspected by prospective buyers. Buyers and auctioneers then meet in the salesroom and selling takes place there, amid continuous talk. Goods are usually owned by the shipper and handled by a broker for him, or by a representative of the selling agency. Auction companies receive pay for such services, and this usually amounts to 1½% to 3%. An article, to supply the market for auction must be one which appears continuously, in order to establish its name among buyers; also goods must be of a quality that does not vary a great deal for customers often buy through knowing only the name of the shipper. Oranges from California meet all these conditions very well, and therefore the largest percentage of auction sales are citrus from that state.

Retailers may attend the auction, or may buy from jobbers that do attend the auction. Large chain groups send buyers to the auctions. Independent store owners usually use the jobber method, as they do not have the time to attend the auction, nor buy in sufficient quantities to make it profitable.

For the buyer for institutions, several methods of purchase are possible. The buyer may attend the auction. Quantity buying may be done at the terminal from car-lot distributors. Purchases may bemade from jobbers, or from peddlers. And the local retail stores always furnish small quantities if other amounts are too large to buy and handle advantageously. Large price variations exist,depending upon the method.

2. Consumption of Citrus Fruits.

a. Per Capita Consumption and Uses.

The American diet is changing, as can be demonstrated by the figures regarding the per capita consumption of various cereals, fruits, and vegetables. The per capita consumption of oranges has been stated by Thompson (7) to have increased from 19 pounds in 1923-25 to an average of 26 pounds ten years later, 1935. Hamilton and Brooker (36) estimate the consumption per capita of oranges and grapefruit in 1899-1900 to have been about seven pounds, while in 1931-32 the consumption of these two fruits averaged 34 pounds, or an increase of nearly 500% in 32 years. Armstrong (32) shows in charts that the consumption of wheat, meats, potatoes, corn, bananas, apples, and peaches has declined during the last thirty years. At the same time, the consumption of onions, celery, carrots, lettuce, pears, canned vegetables, canned fruits, grapefruit, lemons and oranges has materially increased. He has computed the per capita consumption of grapefruit to be 6.59 pounds, lemons at 3.91 pounds, and oranges at 27.08 pounds for the year 1936.

California Fruit Growers' Exchange, in order to assist in its advertising campaign for California citrus fruits, has taken a survey of the income, budgets, buying habits and uses of food of many families in the United States. In order to study more closely the habits of these families, one thousand families considered to be representive of a cross-section of the states were selected. This group was called "Sunkist Town". Selections were made in an attempt to give an accurate cross-section as to income classes, by size of city, by age groups, and by geographical location. It was composed of 789 urban families, averaging 4.03 persons per family; and 211 farm families averaging 4.29 persons per family. The averages for all families in the community, both rural and urban, were as follows: husband, 41 years; wife, 41 years; and children 10 years. Eight hundred ninety-three of these families were of the white or Caucasian race, 94 were Negro families, and 14 belonged to other races. Six hundred ninety-five families were composed of four or less members, while 305 families had five or more members. The average size of the family was 4.11 members. In sixty of the families, there was no member gainfully employed. This means, that if the family did not have enough to live on its accumulated income, it was living on relief, or on the charity of relatives. Six hundred

twenty-one of these families had one gainful worker, while 319 had two or more workers gainfully employed. Eighty-eight of these families rented rooms to outsiders. Only 18 out of the 1,000 families had money enough to employ servants in the home. All these facts seem to present an average or cross-section which should be typical of the American habits.

Of these 1,000 families, 810 used oranges in some way or other. Uses to which they put oranges are interesting.

No. of Families	Use
640	Juice
462	Whole
332	Salads
267	Orangeade
211	Fruit Cocktail
194	Sliced
154	Halved or segmented
146	Cooking or Baking
105	Fruit punch
97	Alcoholic beverages

As will be noticed, juice and whole are the two most popular ways of serving oranges.

Lemons were used by a few more families than those using oranges. Eight hundred ninety families used lemons in the following ways:

No. of families	Use
694	Cold lemonade
552	Tea
534	Lemon pie
303	Flavoring, seasoning
267	Garnish
249	Remove stains
240	Cooking, baking
223	Salad dressing
205	Hair rinse
151	Alcoholic beverages
142	Health drink
125	With orange juice
89	With tomato juice
80	Whole
62	Hot lemonade.

These figures might be taken as the desires of the customers for the fruits used in various ways, as people usually prepare things at home in just the way they prefer them. (38)

Thompson attributes the increase in citrus consumption to several factors. Dietitians, doctors, nurses, social workers, and home economics educators have encouraged the use of citrus fruits as a menas of securing a more optimum diet for all members of the family. National advertising on the part of California Fruit Growers' Exchange has brought the attention of the public to the healthful properties of these fruits. The production of better quality fruits, and more uniform methods of distribution of the fruits have been established through the efforts of merchandising agencies and the agricultural agencies. The availability of the fruits in different markets and at all seasons of the year cause their more wide use. (7)

2. Consumption by areas.

The figures compiled by the United States Department of Agriculture show the car-lot unloads of the fruits in the sixty-six important cities in the United States. The average consumption of each city for each of the fruits is shown in tables LXXXIX to XCIII, having been computed from the government figures for the separate years.

New York City alone receives an average of 27,959 cars of citrus fruits each year, which is over 26% of the total shipments. Chicago, the second largest city, had an average of 9,239 carlots of citrus fruits unloaded. Seventeen cities annually receive more than 1,000 cars of citrus fruits, and of these, New York, Chicago, Boston and Philadelphia each took over five thousand carlots of these fruits. Approximately 51% of the total carlot shipments of the United States came into these four markets. (Table XC)

In order to present an analysis by sections of the United States, these cities have been grouped into large geographical areas. (Tables LXXXIV, XC) The New England and Middle Atlantic States received over 56% of these total unloads. The Central States use almost one-third of the total citrus fruits shipped, 31% arriving in this area. This leaves only 13% used in the southern and western states. This is not a true picture of the situation in these districts, as practically all of the fruit entering the markets in these states, especially Los Angeles, Jacksonville, and the other cities in California and Florida, come in via the motor trucks. (Tables XCI, XCII, XCIII)

D. Prices of Citrus Fruit

1. Costs of the fruit.

a. Costs of production

The cultural cost of oranges and lemons in California has been investigated by the California Citrus League, an organization which includes most of the citrus growers of the state. This study was done over a period of five years, 1924 to 1928, and included about 18,000 acres of oranges and 8,000 acres of lemons. Average cost of lemons per packed box was $1.474, and the average cost of all oranges per packed box (up to the time of picking) was $1.381. The cost of Washington Navels was $1.296, and at the same time Valencia oranges cost $1.489 per case. (24) At this rate, the cost per acre of producing the oranges averages $252.00 or $253.98 for Washington Navels and $248.53 for Valencias. Lemons, per acre, cost $262.48.

Since that time the cost of production must have decreased. Charles Teague, in discussing Exchange problems, states that an income of $117.00 per acre is less than the cost of production, while an $216.00 income per acre can bring a small profit to the

average grower instead of a loss. (21) Paul Armstrong gives the price paid the grower for fruit on trees averaged $ .909 per box. (32)

The costs of Florida fruit can be computed from average figures. The cost of planting and caring for an orchard until the bearing age is roughly estimated at $500.00 per acre by Vosbury and Robinson. (23) Scott gives the cost per acre as $331.41, for all expenses to the end of the fifth year, less the income received the fifth year. The cost of maintaining a grove after it reaches the bearing age averages from $75.00 to $150.00 per acre. The average yield per acre is about 150 boxes. So it appears that the cost of growing of Florida fruit is between $.50 and $ 1.00 a box. This, plus cost of the original investment apportioned over the bearing period of 30 to 40 years, represents a cost of $.57 to $1.10 per case.

b. Costs of Handling.

The Agricultural Experiment Station has made very thorough studies of the cost of handling the citrus fruit from the tree to the car in Florida. This study was carried on by H. G. Hamilton, Associate Professor of Marketing, College of Agriculture, University of Florida, and Marvin A. Brooker. This study included the volume of fruit handled by 95 to 125 packing houses in 1924-25, 1925-26, and in 1931-32 which handled from 40% to 68% of the commercial production. (36)

The costs of handling bulk and packaged fruits are quite different. The increasing popularity of bulk fruits is demon-

strated by the fact that in 1924-25 such fruits made up only 2.9% of the total Florida crop, while in 1931-32 the volume had increased to 21.1%. No doubt the figure is much higher at the present time, for the number of stores handling bulk fruit is constantly increasing. (36)

The cost of handling fruit at the latest date studied by this group, was 75.9 cents per box average. This included the handling and packing the citrus fruit from the tree to the car, but did not include the cost of pre-cooling. This cost varied from 58 cents to $1.56 per box. The average figure is broken down into the component parts, as follows: labor, 15.3¢; management, 3.7¢; office, 2.4¢; packing house and land, 3.7¢; packing equipment, 4.5¢; field equipment, 1.3¢; light, water and power, 1.1¢; materials 27.9¢; other costs, 2.6¢; making the total packing house costs 62.5¢. To this was added the picking costs of 7.2¢ and the hauling costs of 6.2¢. (36)

The cost of handling bulk fruit at this same date, was only 42.4¢. It is easy to understand this difference of 32.5¢ when it is noticed that the materials, including paper, boxes, nails, labels and other materials, comprised 27.9¢ of the above cost, and that labor of packing would be eliminated in the bulk fruits.

No such study could be obtained for the Texas fruit, but it is fair to expect the cost to be similar, unless labor costs vary widely. Even then, the variation could not be great, as labor totaled only 15.3¢ of the total cost.

The cost of handling California fruit is estimated by the California Fruit Growers' Exchange as picking and hauling 14.8¢ per box, and the cost of packing as \$.474 per box. (32) This totals \$.622 per box as contrasted with \$.759 average cost for the same service in Florida. The cooperative enterprises have reduced cost of separate items through thorough study and effort. Ownership of forest reduces cost of boxes, and ownership of plants reduces overhead. Such items lower total cost.

The assessment of the marketing organizations or state commission must be added to this. The assessment levied by the California Fruit Growers' Exchange for marketing costs were 5.02¢ per packed box last year. (21) The assessment by that organization for advertising purposes was five cents on each packed box of oranges, ten cents on lemons, and three cents on grapefruit. (21) The levy made by the state of Texas is $2\frac{1}{2}$¢ for each box of citrus fruit, or $1\frac{1}{2}$¢ per bushel in smaller containers, and $2\frac{1}{2}$¢ for each eighty pounds of fruit sold in bulk. Florida charges an inspection fee of 1¢ for each standard box of 1-3/5 bushels of fruit inspected for maturity, and requires this inspection from August 31 to December 1. A charge of $\frac{1}{2}$¢ for each box to which artificial color has been added, is an additional inspection cost. Advertising tax levied by the Florida state organization amounts to one cent per standard box of oranges, three cents per box of grapefruit, and five cents per box of tangerines.

The cost of various methods of preservation vary as follows:

For pre-cooling, 9.5¢ per box; initial icing, 10.3¢; pre-cooling and initial icing, combined, 18.1¢; pre-cooling and standard refrigeration, 27.3¢; and for standard refrigeration alone, 19.1¢. Fruit shipped by standard ventilation would, of course, have no preservation charge. These figures were compiled in 1930-33, and are perhaps changed by now, but relative costs of the different methods would probably be in the same ratio. (28)

Freight makes up a large item in the total cost of citrus fruit on the northern market. The distance from the origin to the place of consumption in vicinity of Lansing is about twelve to fifteen hundred miles in the case of Florida, and nearly three thousand miles in the case of California. The rate for shipment of fruit by rail from Florida to Detroit in 1933 was $1.02 per box. (28) The freight from California to the eastern market averaged $1.14 last year including the refrigeration. (32). This item then amounts to as high as twenty-five percent of the total retail price of the oranges.

The citrus fruit from California and Texas which arrives in Lansing is shipped via the Grand Trunk and Western Railway. The rate for shipments from California is $1.42 per hundredweight plus the expense of initial icing. The icing charge varies with the size of the car, and averages from $38.00 to $57.00. The average crate of oranges weighs 70 pounds net and about 80 pounds gross. Therefore, the freight per box is in the neighborhood of $1.13 plus about $.09 icing charge. (a) The rate for grapefruit from Texas is $.88 per hundredweight, or about \$.75 per case. (a)

Beginning May 1st, 1939, a new service was to have been inaugurated. This was to allow a stop-off of a car of fruit to have part of it unloaded, and the remainder forwarded to another destination. This may have its advantages to markets which cannot handle an entire carload at one time, but may cause too much loss of fruit through delay.

Fruit from Florida reaches Lansing via the Pere Marquette Railway and the Michigan Central Railway. The rates from Winter Haven, Florida, the origin of much of the fruit received this year, is \$.97 per hundredweight plus the icing charge. The charge for complete refrigeration which includes re-icing, amounts to about \$100.00 per car. Florida boxes weigh about 90 pounds gross, and thus the freight per box would be about \$.87 plus about \$.23 for icing charges. The rate for fruit loaded in bulk is 10% higher than for boxed fruit, due to the fact that it is loaded green, and because it is more perishable,-if spoilage does start it carries through the fruit more readily than where the fruit is separated in boxes. (b)

Therefore, the costs of shipment of fruit from the following sources are: California, \$1.13; Florida, \$.87; Texas, \$.75 per case. Icing prices are \$.09 per case for initial icing from California and \$.23 for complete icing from Florida. Therefore, Florida fruit can be transported to the Lansing market cheaper than California fruit, as would be expected from comparing distances. Texas fruit transportation is cheaper than that from Florida, to the Lansing destination.

(a) Interview with Grand Trunk Freight Agent.
(b) Interview with Pere Marquette Freight Agent.

Selling charges charged by the broker doing this service for the shipper, may be charged as a percentage of the selling price. On terminal markets, this amounts to 1½% to 2% of the price. Other charges are added to cover the labor necessary to move the fruit through the auction shed. This usually ranges from 1 to 5 cents per box. These charges include storage, drayage, demurrage, reconsigning and government inspection. The total selling charge, therefore, ranges from 5 to 7 cents per box. (28, 32, 35)

From totaling these items which must be paid before a price can be set for the fruit on the market, it would appear that the average cost to the jobber of Florida fruits sold in package is in the region of \$2.50, while bulk Florida Fruits cost about \$2.10 and California fruits \$2.75. Although these totals will vary from one year to another, and from one season to another, these items of cost will remain, and must be reckoned with if the institution buyer wishes to understand the economic basis for the pricing of citrus fruits.

It is apparent that there are times when the price offered on the distant market will not justify the gathering and shipping of fruit. During April, 1939, visitors in Florida saw grapefruit being knocked from the trees, and hauled to the fields for humus. This included both Duncan (seedy) and Marsh (seedless). Visitors were given fruit by the bushel. This is regarded by some as an advertising scheme

for the fruitgrowers. Probably the large quantities of fruit being shipped from Texas is the factor which has affected the Florida market.*

2. Prices of the Fruit on the Markets.

a. Wholesale Prices in Detroit.

Prices of oranges from Florida which were sold on the Detroit market for the season 1937-38 varied from $1.68 to $4.45 per case, with an average price of $2.25 per case. The highest price was found at the beginning of the season, October 15, and the lowest price was found on April 29th. (Graph XLVII) (Graph XLVIII). At the same time, the California oranges ranged in price from $2.15 to $5.40 per case in that same market. (Graph XLVII). These averaged $3.00 for the entire season. Grapefruit on the Detroit auction sold from $.75 to $3.59 per case for fruit originating in Florida with an average price of $2.20, while the fruit from Texas sold from $1.93 to $3.17 per case with an average of $2.23. (Graphs XLIX and L). Prices for tangerines on the Detroit market varied from $1.03 to $2.23 per case of 4/5 bushel (Graph L) with an average price of $1.23. Prices at all auctions are shown in Graphs LI and LII (Tables LXXXIV to LXXXVIII.)

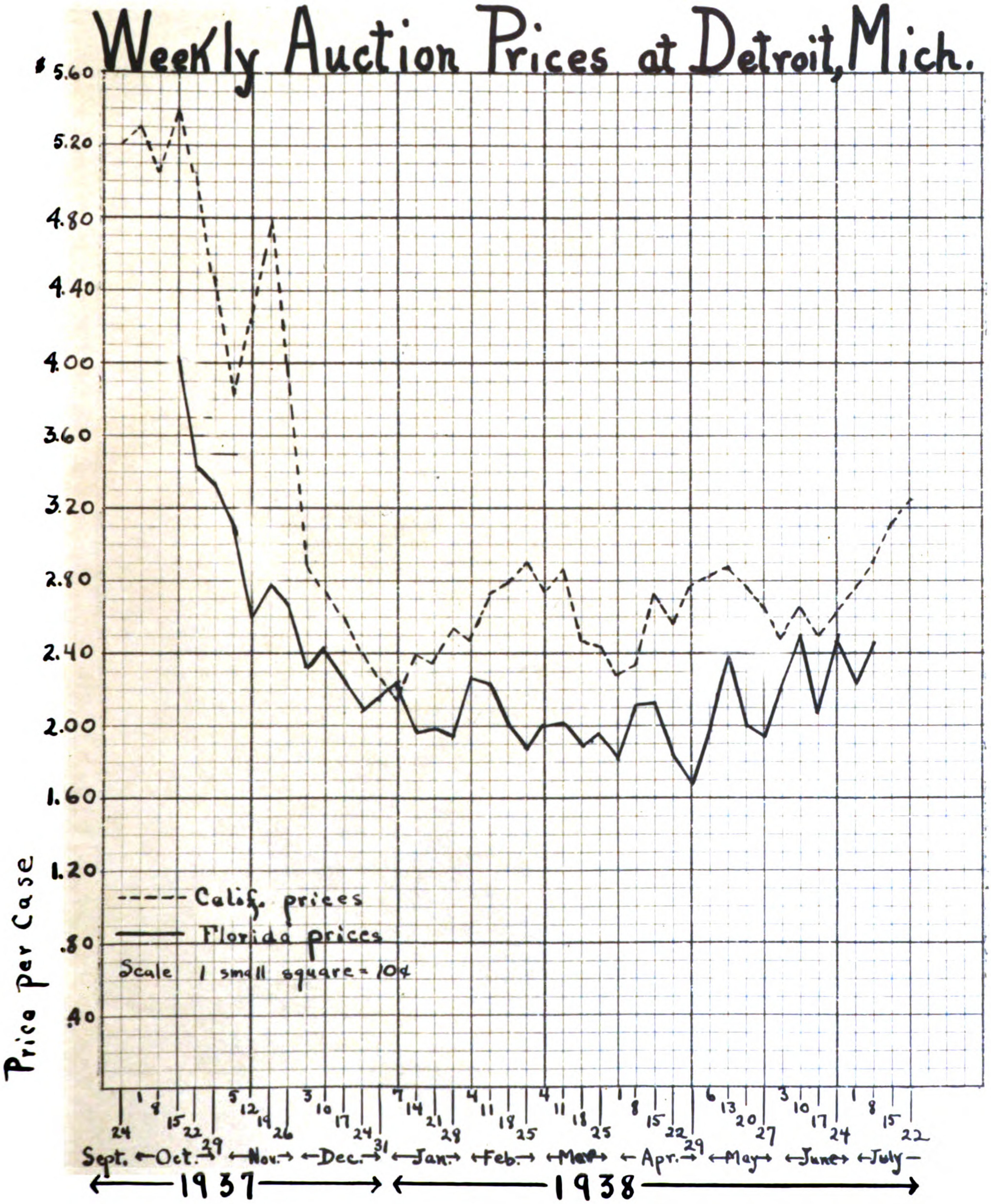
b. Retail prices.

Retail prices which were collected at the local stores over a period of three months show little variation in price from time to time. It does show the items which were available on the local market, and thus available to the small institution which would find it necessary to relie on the local market for its supply.

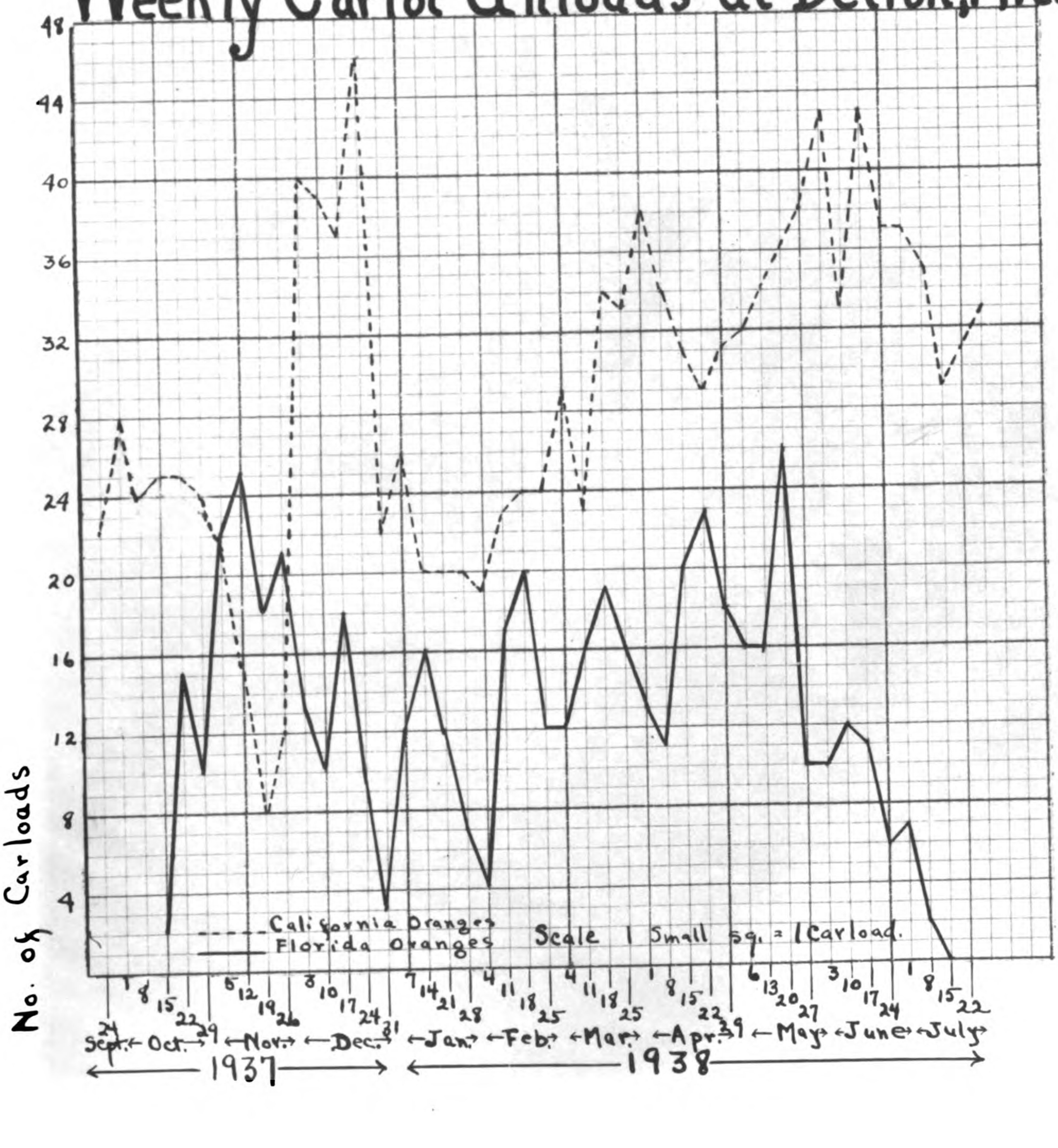
---

* Interview with Mr. Max Strothers of East Lansing, Michigan.

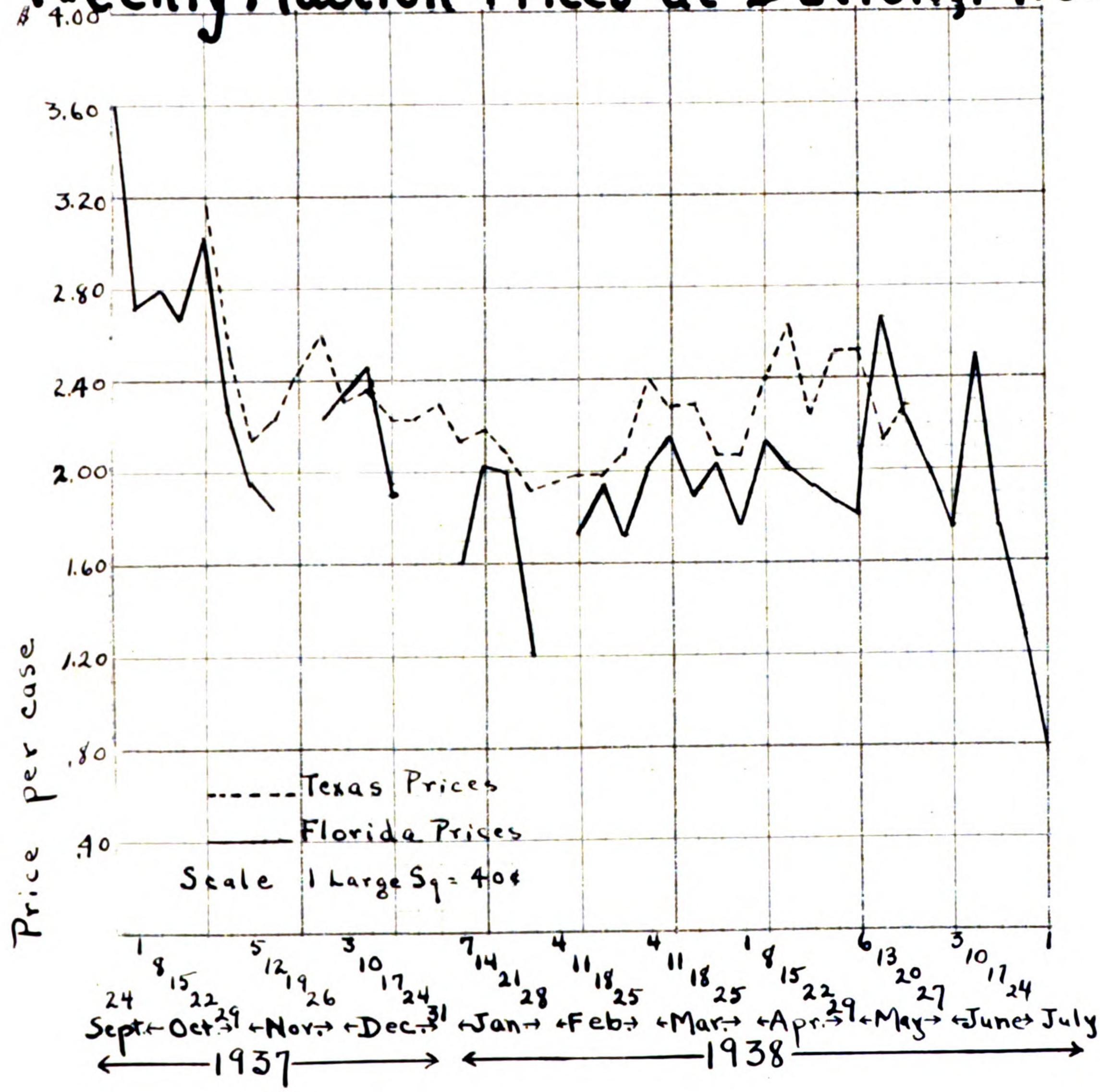
Graph XLVII
Oranges Prices



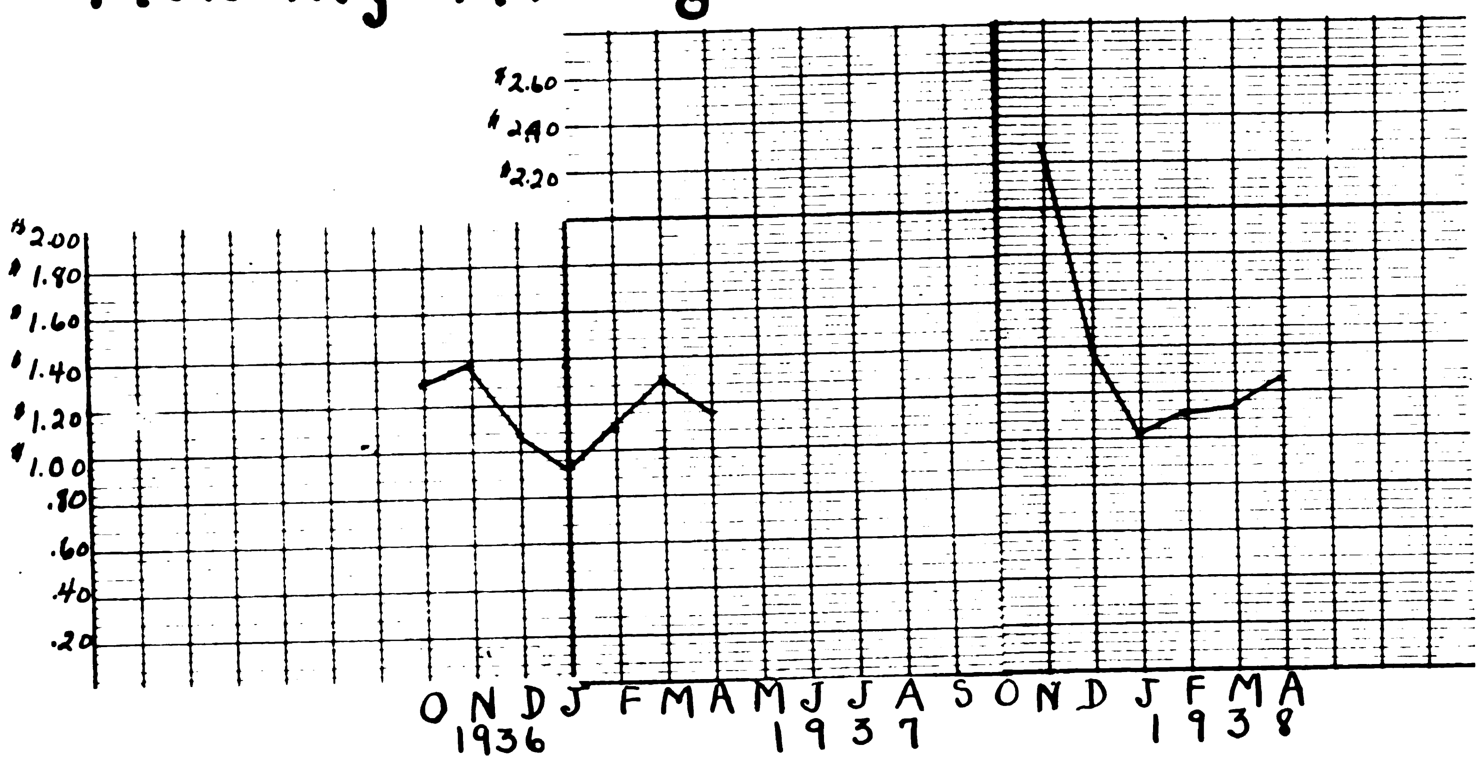
Graph XLVIII
Origin of Oranges
Weekly Carlot Unloads at Detroit, Mich.



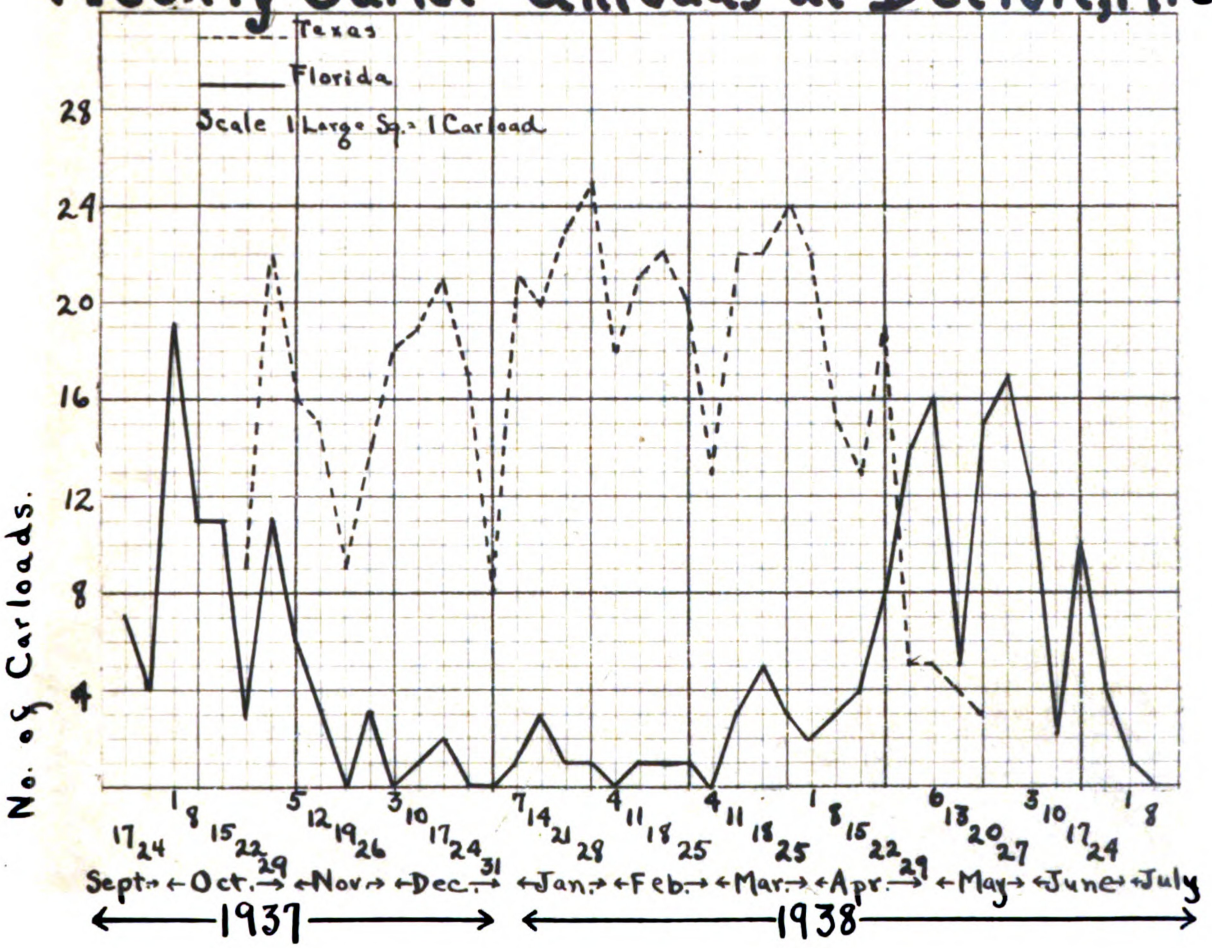
Graph XLIX
Grapefruit Prices
Weekly Auction Prices at Detroit, Mich.



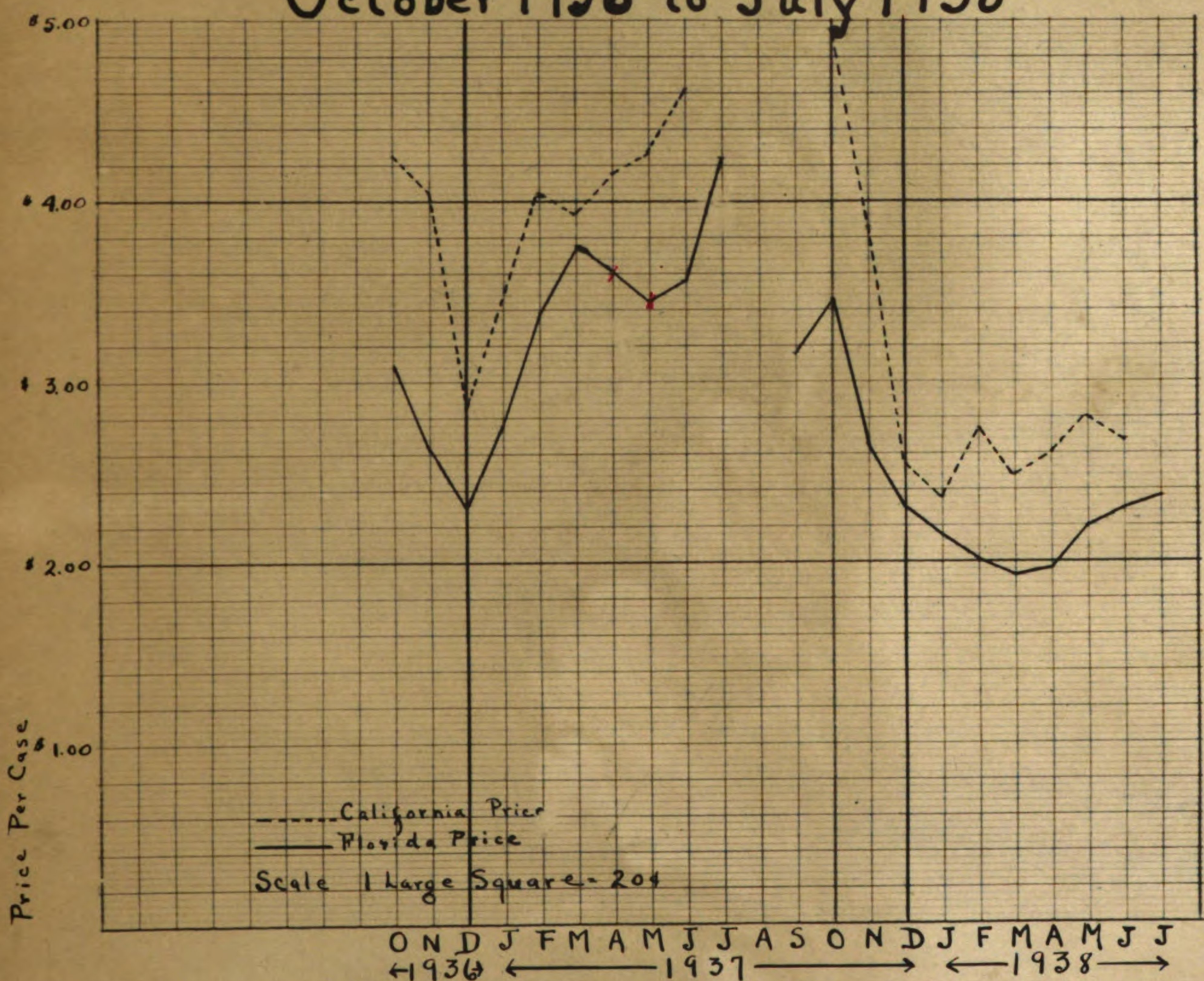
Graph L
Tangerine Prices
Monthly Averages — All Auctions



Graph LI
Origin of Grapefruit
Weekly Carlot Unloads at Detroit, Mich.



Graph III
Orange Prices
Monthly Averages — All Auctions
October 1936 to July 1938



E. Comparison of Quality of Fruits.

1. Sizes of Fruits

The sizes of the fruits as they are packed for shipment are based on the diameter of the fruits. It was desirable to know whether that dimension alone was enough to tell the buyer the amount of fruit that he was purchasing. In the case of the oranges which were later juiced, weights were taken on each orange to the nearest tenth of a gram. (Tables XCIV to XCVIII) In each case except the size 150 and size 176 Florida Valencias, the larger orange by weight of one size was heavier than the smaller orange by weight of the next size larger. For example, the largest orange of size 288 weighed 142.5 grams, while the smallest orange of size 250 weighed 128.2 grams. This would lead to the conclusion that the size of oranges is not truly indicative of the weight of fruit.

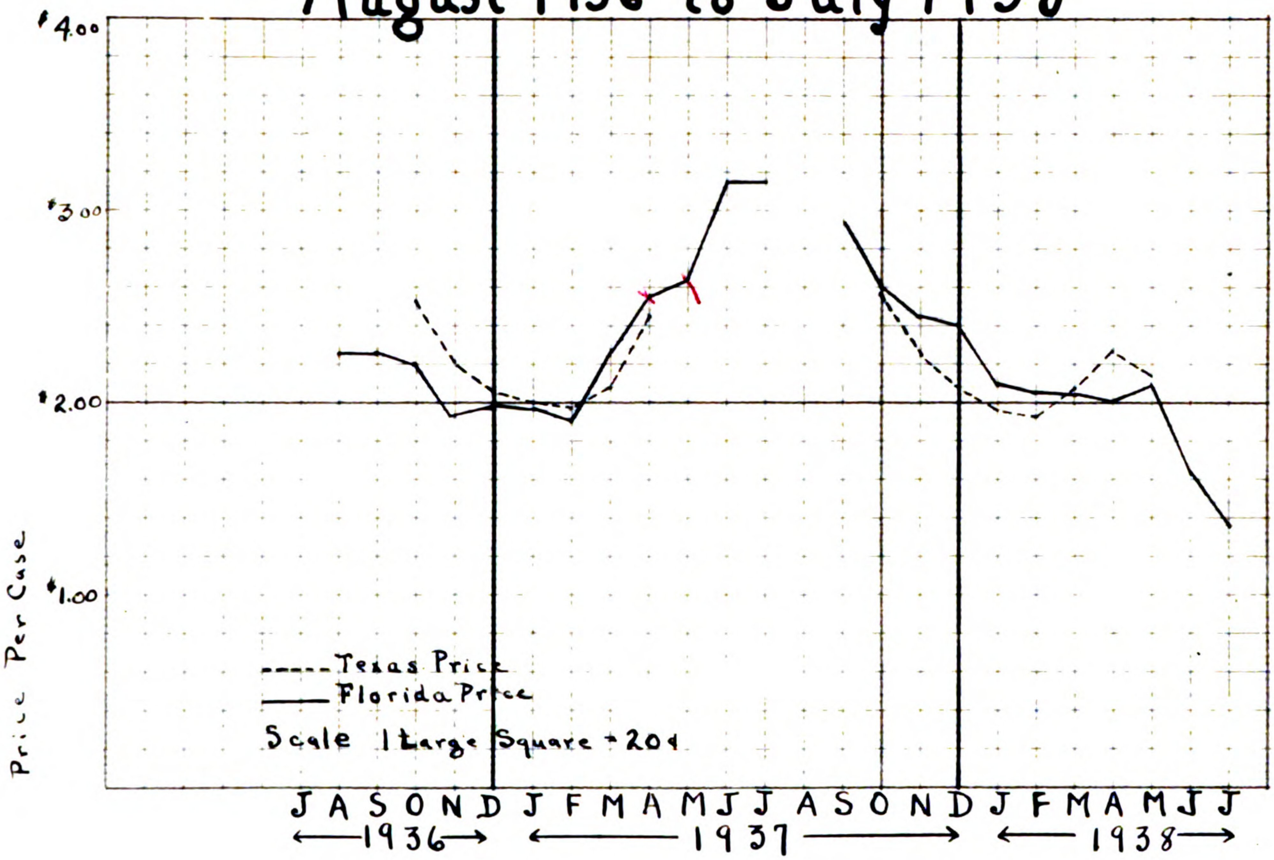
Because only one dozen samples of each size were taken, it was thought that perhaps the sampling was not sufficient to prove the above statement. Therefore, $7\frac{1}{2}$ dozen oranges each from a case of Florida Valencias, size 150, and California Navels, size 150, were used. This larger sampling shows a variation in each case to be of a wider range than was found for the dozen sampling. The average weights were as follows:

	Florida	California
Average	252.56 grams	214.25
σ n	1.49	1.27

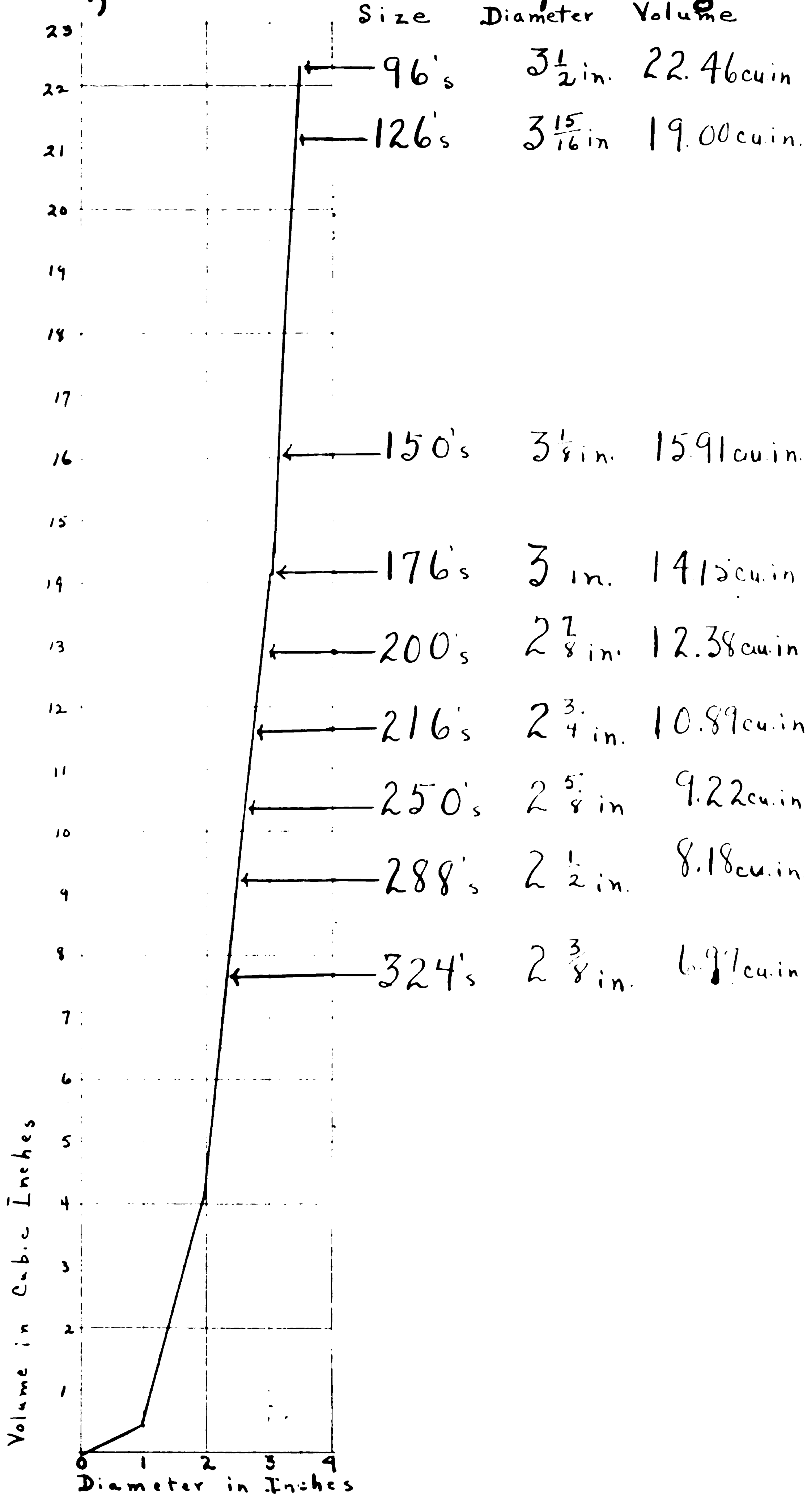
On testing for significance it was found that the Florida oranges were significantly heavier than the California oranges. Further evidence of this is shown by Graph LVI.

From the two above experiments, it would appear that if the institution buyer is interested mainly in the number of

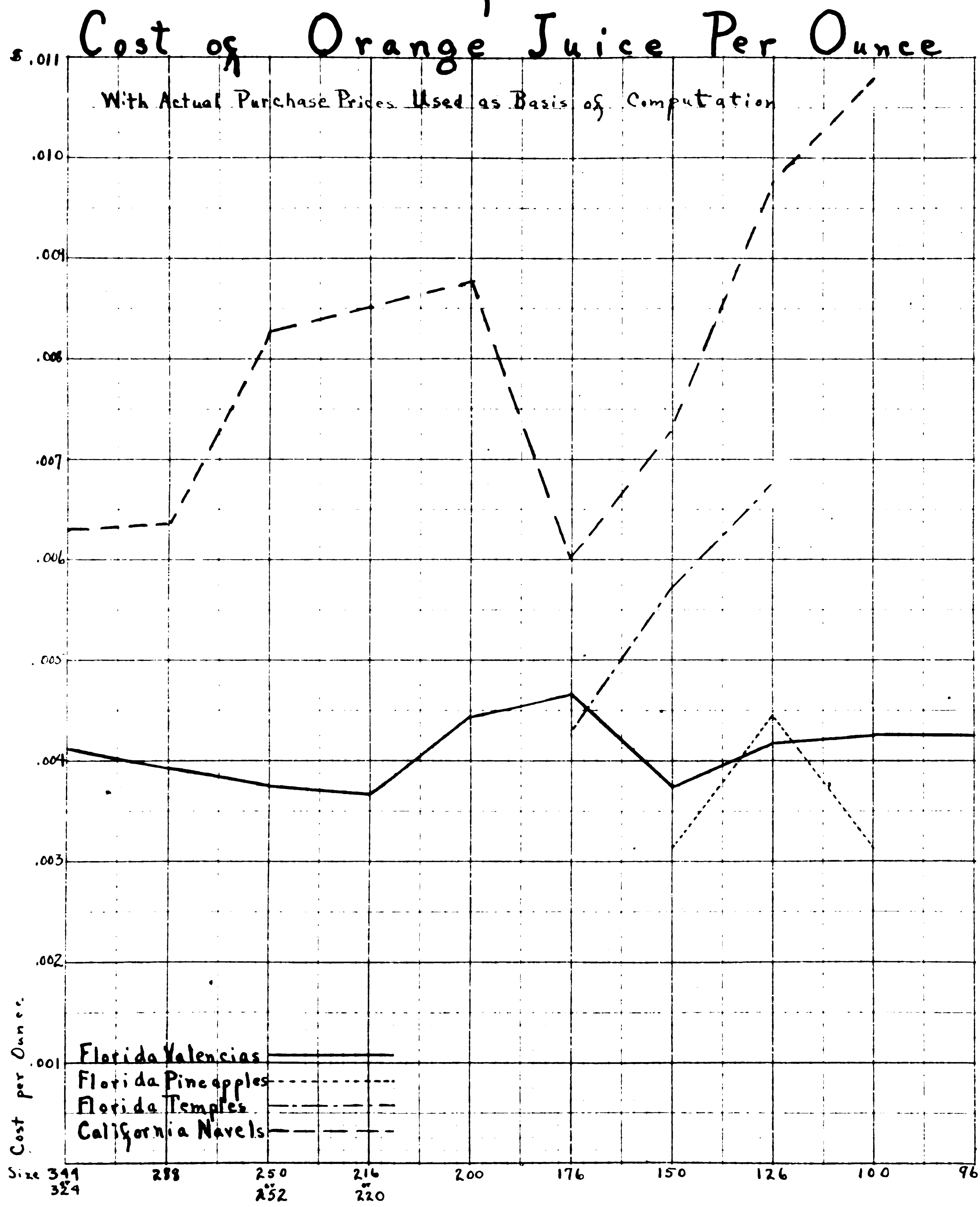
Graph LIII
Grapefruit Prices
Monthly Averages — All Auctions
August 1936 to July 1938



Graph LIV
Volumes of Various Sizes of Oranges

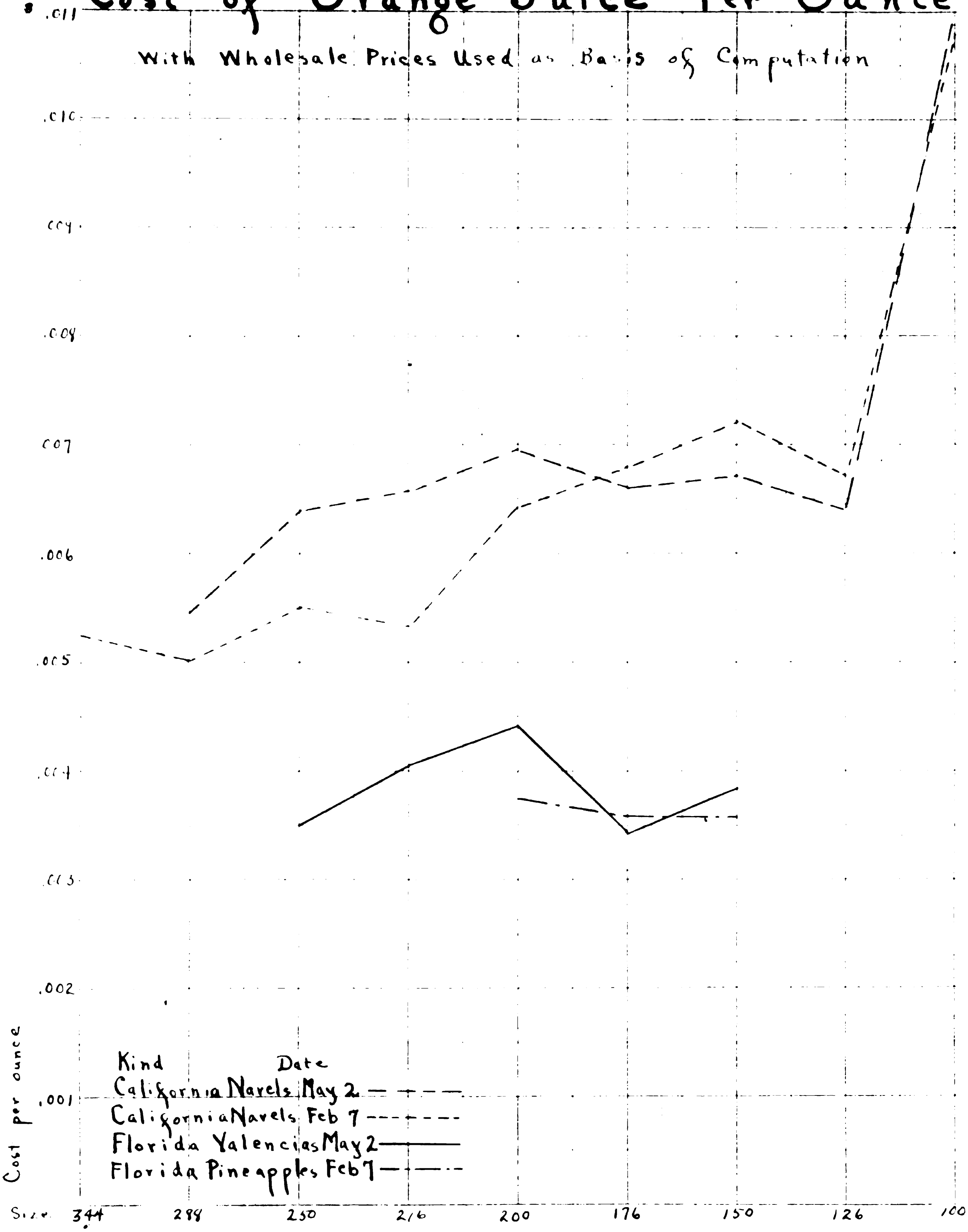


Graph LV

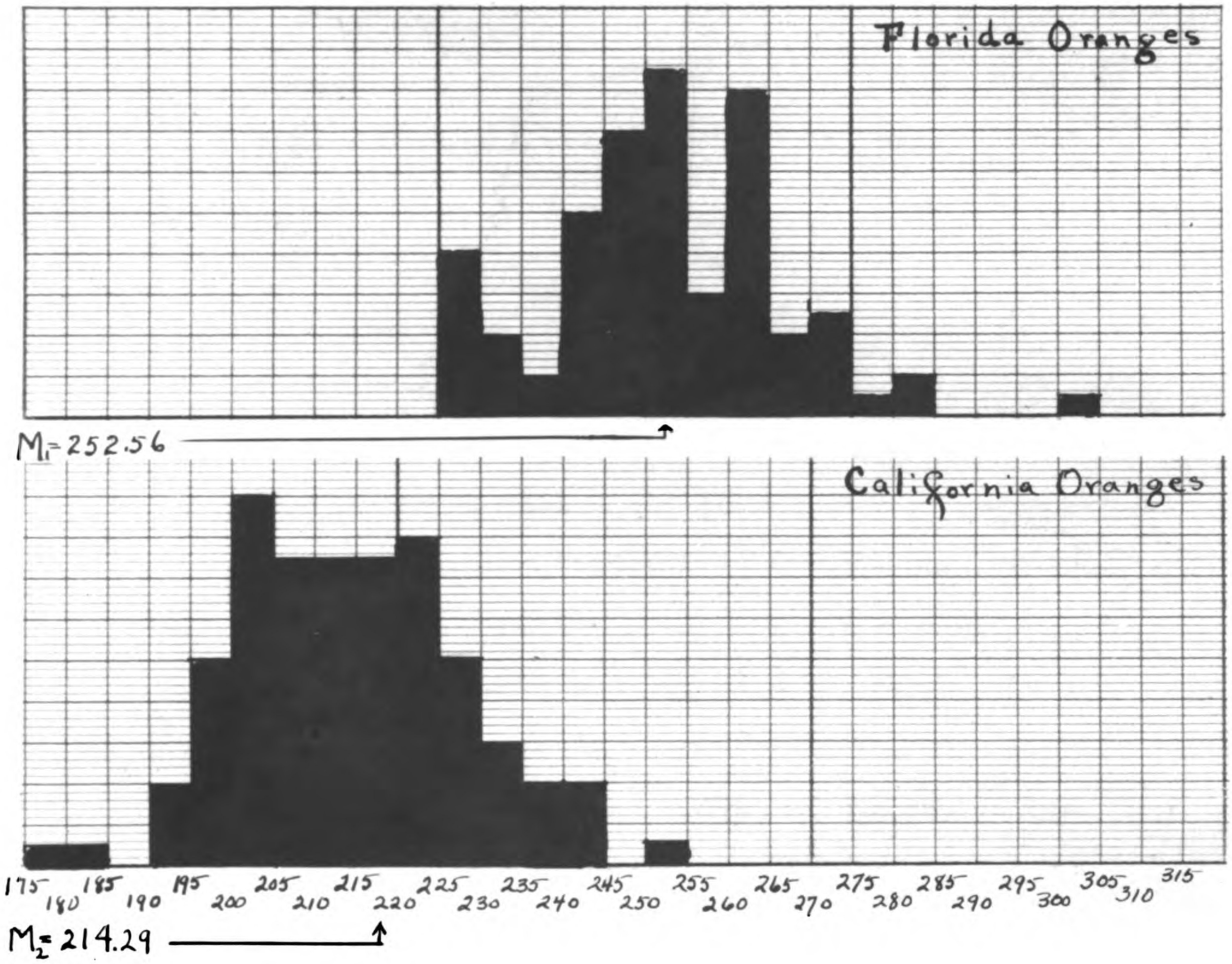

Cost of Orange Juice Per Ounce
With Actual Purchase Prices Used as Basis of Computation
$.011
.010
.009
.008
.007
.006
.005
.004
.003
.002
.001
Cost per Ounce
Florida Valencias
Florida Pineapples
Florida Temples
California Navels
Size 344 or 324
288
250 or 252
216 or 220
200
176
150
126
100
96

Graph LVI

Cost of Orange Juice Per Ounce



Graph LVII
Weights of Florida and California Oranges



units which are obtained in any one purchase, size is the correct factor to notice, but if the weight of food is the desired information, the weight of the fruit would be more indicative of the amount of food purchased.

Few people realize that the volume of a sphere increases in direct proportion to the cube of the diameter. Volumes of sizes from diameters are shown on page 116.

2. Juice

a. Volume of juice from various sizes and varieties.

Since one of the methods of selling or serving citrus fruits in the institution today, is the serving of juices by the glass, the information which many institution buyers wish to know is which is the cheapest size of orange to buy for juice purposes. Accordingly, all obtainable sizes of the different varieties on the market were juiced, and the weights and measures of strained and unstrained juices recorded. From these, it was possible to compute the ounces of juice from each size of orange, and the cost of such juice. (Tables C, CI, CII)

Of the three sizes studied, the size which proved to give the highest percentage of juice of the Florida Pineapple oranges was size 150. (Table CV)

Florida Valencias were studied in all sizes on the markets, 96's to 324's. From Table CIII it will be noticed that size 216 gave the highest percentage of juice with regard to the original weight, and that size 126 was a near approach to the same percentage, differing by only .15%.

Of the sizes of California Navels studied, which included all the sizes from 100's to 344's, the size which gave the largest amount of juice in proportion to the original weight of the oranges was size 288. (Table CIV)

Bulk Florida Valencias on the market are not always sized, but are often graded as to external condition. The bulk varieties on the market were a mixture of U. S. Grades #1, #2, and #3, as shown in Table CV. Grade #3 gave the highest percentage of juice, although there was little difference.

Florida Temples for sale in Lansing, were not sized by the packers, but were sorted into sizes here before sale, and the means of so doing was only the eye of the untrained employee. However, the approximate sizes were placed on the fruit. Those which the store sold as size 176 gave the highest percentage of juice, but the difference between the three sizes was only 6%.

b. Cost of juice from various sizes.

If the oranges are to be sold as juices, the institution person is interested in the cost of the prepared juice per unit. Since the capacity of glasses and cups vary, the cost was computed for a fluid ounce of the juice. The first computation was based on the actual cost of the oranges in East Lansing, Lansing, or the Detroit terminal where the oranges were purchased.

The cost of juice prepared from the Florida Pineapple oranges was nearly the same for sizes 150 and 200, this cost being \$.00318 and \$.00315 per ounce respectively. The cost of size 176 was \$.00445 (Table CV)

Florida Valencias yielded the cheapest juice when size 216's were used, the cost per ounce of strained juice being \$.00369 per ounce. Low prices were also possible when sizes 250, 150 or 288's were used. (Table CIII, Graph LIV)

California Navel oranges purchased on the retail market appear to produce the cheapest juice if purchased in size 344. The juice from this size was \$.00627 per fluid ounce. The larger sizes were much more expensive in relation to the juice produced, when all were purchased on the retail market, with the juice costing approximately one cent per ounce. (Table CIV)

The juice from Florida Temples was cheapest in the smallest size used, size 176. (Table CV)

The highest percentage of juice obtained from all oranges studied was obtained from bulk Valencia oranges shipped by express from the orchard direct to a local retail store. This shows that either the time which elapsed between the time of picking and the time of consumption in the usual way of marketing, or else the difference in the maturity of the oranges when picked, has a decided effect upon the amount of juice obtained from the fruit.

Because all of the oranges which were juiced and costs computed on were not purchased on a wholesale basis, and because of the fact that they were bought on different dates, it was thought that the comparisons would be more valuable if computed as if all oranges had been bought on one day at wholesale prices on the Detroit Terminal. Computations made using this assumption are shown in Table CVI . Here it will be observed that the California Navel oranges produce juice which becomes progressively cheaper in cost per ounce through most of the sizes except for the size 126 which do not usually find a ready market, and are therefore cheaper. The low point in cost is reached with size 288, with 344 being a bit more wasteful. (Graph LV)

The Florida Pineapples do not vary much in price when purchased wholesale. Size 176 yielded the juice which was slightly cheaper.

Florida Valencias yielded the cheapest juice when using size 216 , and the most expensive when size 150 was used.

California Valencias were not on the market at the time this study was made.

In using Florida Temple oranges, size 176 was found to be the most economical. This was the smallest size used.

Therefore, it is possible to conclude that the smaller sizes yield the least expensive juice, with the exception of size 324 or 344, no matter what the variety of orange. This agrees with the findings of the Greater New York Dietetics Association study in which it was concluded that "The smaller oranges yield more juice." (18) It is also in agreement with the practise of the University of Michigan Hospital Dietetics Division which has "used size 252 oranges for juice for at least ten years. The amount of juice is measured by the dietitians on the first and fifteenth of each month the year round, and the yield varies from 13 to 18 quarts of juice per case. The average is 14 or $14\frac{1}{2}$ quarts". Miss Mary E. McKelvey is the dietitian in charge of this work, and the information was obtained through the courtesy of Miss Mable MacLachlan, Director of the Department of Dietetics and Housekeeping.

The variations in cost per ounce (0.05¢ or $\frac{1}{2}$ mill) of strained juice from different groups of Florida oranges purchased by weight regardless of size were so slight that they are well within the errors of measurement, while the differences in cost of juice of California navels obtained from different sizes as if purchased on the same day in the same market were as great as .15¢ or $1\frac{1}{2}$ mills. Therefore, in spite of difficulty in getting accurate weights and in spite of variations in the percentage of juice obtained from different sizes, (41.6% to 49.5%), it appears that purchasing oranges by weight is a wiser plan than purchasing them by the grade size alone. This agrees with Wyse (11) who found the cost of juice on Florida oranges bought by the pound to vary \$.005 per cup, while California navel oranges yielded juice which varied \$.035 per cup.

c. Effect of storage condition on volume of juice.

Oranges are often held for several days or a week after purchase before use. It is advantageous, therefore, to discover whether holding these fruits and whether conditions under which they are held affect the volume of juice.

Three dozen oranges were obtained from a box each of California Navels 220's and of Florida Valencias 150's. One dozen of each were weighed and juiced immediately. The other two dozens were weighed individually and then one dozen of each variety was placed in a storeroom at a temperature of about 70° to 80° Fahrenheit for the week. At the end of that time, weights of individual fruits were taken again and compared with the original weights. Juices extracted were computed for the percentage of the original weight yielded. (Tables CVII, CVIII)

The results were a surprise, as it was expected that the fruits would yield a much lower percentage of juice after being placed in dry storage. The loss of weight of the Valencias stored in the warmer place was much greater, averaging 18.78 grams, while the loss of weight in those stored at refrigerator temperatures lost an average of only 3.0 grams. The losses for the California navels were 9.57 and 1.07 grams in the same two instances. Part of this small apparent loss might be due to the fact that the cool fruit, when brought out into the warmer air, had a layer of condensed vapor on the outside, as they appeared wet. Moreover, when the fruit was compared for appearance, the common storage oranges looked dry, while those from the refrigerator looked much fresher. Table CVIII shows that the fresh Valencias juiced 60.15% while those stored in the refrigerator juiced 53.9% and those from warmer storage juiced 54.5% of the original weight. The California Navels juiced 43.194%

fresh, and yielded 42.6% under refrigeration storage, and 42.4% after storage in a warm place.

It may be concluded from the above that the temperature of storage does not materially affect the percent of juice obtained. The reason then for cooler storage must be to retard decay caused by organisms which grow under warm conditions.

2. Flavor.

a. Preference for Juices from Different Sources.

Flavor is a quality which is hard to describe, yet it is very important in the article in question. The flavor of California oranges is different from the flavor of Florida oranges. When offered a choice of California juice or Florida juice, each of six persons preferred the California juice. This might be partially accounted for by the deeper orange color in California juice; however, the writer believes that it was the flavor which was the deciding factor.

When Florida Pineapple juice and Florida Temple juice were tasted by five people, all thought that the Temple juice was far superior in flavor to the juice of the Pineapple orange.

b. Preference for juice from different grades of oranges.

Since some fruit which is offered on the market is graded as U. S. #1, U. S. #2, and U. S. #3, the difference in the quality of the juice was studied. (The oranges sold usually in bulk as a mixture of these three grades, were purchased upon special request with one dozen of each in a separate bag. It would have been possible to have separated them after purchase,

as each has the grade stamped on the skin, but as exactly one dozen of each was desired, the sorting was done by the salesman.)

The rating as to sweetness as judged by six dietitians in the Institution department are shown in the following table:

Judge	U. S. #1	U. S. #2	U. S. #3
1	Second	Sweetest	Sour
2	Sweetest	Second	Sour
3.	#1 and #2 alike		Sour
4.	#1 and #2 alike		Sour
5.	Second	Sweetest	Sour
6.	#1 and #2 alike		Sour

It is apparent from the above that there was some difference of opinion regarding the first and second grades. Perhaps this is due to the difficulty of differentiating between the sweet quality of the two. However, it is definitely shown that the fruit with lower grade according to the grading system set up by the United States Department of Agriculture and described on page 151 of the Appendix, gives a juice of lower sugar content and therefore less desirable. Some described the flavor as insipid.

c. Ability to Detect Lime and Lemon Juices.

It was the opinion of some that the average person tasting lime and lemon juice made into beverages could not detect which fruit had been used. Therefore, it was thought advisable to prepare limeade and lemonade, and see whether judges could dis-

tinguish between the two. The beverages were made with juices in equal concentration, that is, 100 milliliters of juice to 300 milliliters of water and 100 milliliters of simple syrup (made of 1 cup sugar to 1 cup water). In this case, four persons were able to distinguish correctly the fruit that had been used, while two were not sure.

Later limeade only was given twelve judges, and they were told to state whether in their opinion the fruit used was lime or lemon. This time, in preparation, all skin and membrane had been removed, as it was thought that possibly the distinguishing flavor was obtained from the oil of the peel. Dean Bessey, in referring to a test of this sort some time ago in Florida, stated that no difference could be told if peel and membranes were removed. Eleven of the twelve thought that lime had been used, while one thought it was lemon.

It appears then, that lime can be distinguished from lemon when used in beverages.

It was thought that the peel oil present in the limeade and lemonade used for judging might have affected the flavor enough to affect the detection. Therefore, limes were prepared by peeling the fruit and removing the pulp without membranes. The pulp was then squeezed, and this juice used to prepare limeade. This beverage was tested by twelve judges, and their opinion asked as to which fruit was used, lemon or lime. Eleven of the twelve recognized the juice as lime. Two were only positive that the fruit was not lemon, and thus deducted

that the juice must have come from lime. One person was positive that the juice was lemon.

3. Concentration of Limeade and Lemonade.

Limeade was prepared in three different concentrations. In each case 300 milliliters of juice was used, with 100 milliliters of syrup. To this was added 75 milliliters, 100 milliliters and 125 milliliters of lime juice. Judges tasted the limeades, with an idea of deciding the desirable concentration. All six judges preferred the one which included 100 milliliters of the juice.

Lemonade was prepared in the same ways, using the same amount of syrup and water, and varying the lemon juice. The juice was added as 75, 100, 125 and 150 milliliters. One person preferred that made with 100 milliliters, while the other five judges preferred the lemonade made with 125 milliliters of the juice.

This would make it appear that lime juice is needed in less amount to secure the same acidity of beverage. An assertion made to the writer by a person who tried this experiment some years ago, was to the effect that one lime was equal to one lemon in effectiveness of juice. Since limes that appear on the northern markets are not sized, and since there is a great difference in size, this statement might be true if the lemon contained only 1/5 more juice, according to this experiment.

4. Quantity of Juice.

Lemons, because they must conform with the U. S. Standards For Lemons, must contain not less than 25%, by volume, of juice. Therefore, the minimum amount of juice can be judged when purchasing lemons. On the other hand, limes are not sized, and no definite amount of juice is demanded. Therefore, if juice content is to be a factor in purchasing and use, such as for punch, lemons are to be preferred.

d. Preference for Grapefruit from Different Regions.

Grapefruit from three states were tasted by ten judges. The sections,without peel or membrane, were tasted to ascertain whether there was a difference in taste, and whether, if so, there was a preference. All ten judges without knowing source or the opinion of others, agreed that the fruit from Arizona was very sour, bordering almost on the bitter state. Florida, while sprightly acid, had a sweetness with it that made it the most desirable to eight of the ten judges. If Florida fruit was tasted before the Texas fruit, the Florida was preferred. Texas fruit was less acid, and therefore more desirable to the two judges who tasted it first. If tasted after Florida fruit, it was thought to be almost insipidly mild. No judge preferred the Arizona fruit. Different fruits from each state were included in the trial. It would appear, then,that most people would prefer the Florida fruit unless a very mild fruit is desired, in which case the Texas fruit would be the preference.

The Arizona fruit was very light in weight, and had a

thick rind. This would also be a drawback on the market where buyers are accustomed to lifting the fruit to judge it by the weight/size ratio.

IV. SUMMARY AND CONCLUSIONS.

Since approximately $130,000,000 to $150,000,000 worth of citrus fruits appear in the market each year, it is evident that these fruits are of great importance in the American diet. California furnishes about 52% of this crop, while Florida furnishes 41% and Texas 6% of the total. The production of the citrus fruits in the last six years has been increasing, particularly the grapefruit and oranges from Texas. Cooperative marketing organizations have made possible better grading, sizing, quality standards and handling of citrus fruits as well as creating a greater demand for the product. Of all commodities sold in wholesale auctions, California citrus fruits furnish a larger percentage than any other commodity. California and other citrus comprise the major part of the auction sales. Available varieties vary greatly through the year, with lower prices in winter when Florida oranges furnish great quantities and both Florida and Texas grapefruit compete for the market. Prices differ greatly with different methods of purchasing. Comparison of the qualities of the fruits show the following results:

1. Weights of oranges vary greatly with each size rating of oranges, with weights of different groups over-lapping. Therefore, actual amount of fruit obtained cannot be determined

by size when buying less-than-crate lots.

2. Juice obtainable from different sizes varies greatly. Smaller size oranges yield a higher percentage of juice based on the original weight of the oranges.

3. Bulk oranges, not sized but graded, yield the highest percentages of juice for the U. S. #3 grade.

4. Juice cost is less for Florida oranges than for California oranges and less for smaller sized fruits than for the larger. Variations in the cost of juice from Florida oranges vary slightly (about ½ mill per ounce), while that of California navels is much greater, (3 mills per ounce).

5. Cost of juice extracted from oranges bought by weight (if all sizes cost the same per pound) would vary only about ½ mill per ounce for Florida oranges, while California oranges are not sold on the markets of the middle west by the pound.

6. Storage temperatures have little effect on the obtainable juice of oranges stored a week. Cool temperatures inhibit growth of decay rather than prevent evaporation of juice, in spite of the fact that the refrigerated fruits look fresher.

7. Preference for California juice is common, but it is questioned whether it would, for institution purposes, merit the cost which is nearly double in most advantageous sizes.

8. Better grades of bulk fruit yield sweeter, more desirable juice.

9. The difference between lemon and lime juice can be detected by consumers, so it would not be wise to attempt substitution of lemon for lime juice in commercial trade.

10. Lime juice can be used in lower concentrations by about 20% to get comparable strengths in beverages.

11. Lime juice is more expensive than lemon juice at local prices. Therefore, if expense is an item in making punch and similar drinks, lemon juice would be the better buy.

12. Arizona grapefruit, because of the almost bitter flavor, are not preferred by people when tasted with grapefruit from other states.

13. Florida grapefruit are preferred when full acid-sweet flavor is desired.

14. Texas grapefruit are mild, and thought by some to be almost insipid in flavor when compared with Florida grapefruit.

15. Juice content of limes varies, and as the fruit is not sized, the content cannot be foretold.

16. Lemon juice content is fixed by grading standards as at least 25%, and therefore, can be estimated before purchase.

17. When lime or lemon juice is to be used in punch and volume is a consideration, lemons will provide more volume of juice for the money expended.

APPENDIX

APPENDIX

I. Maturity Laws

A. Oranges

1. California -

796. (Extracts from the Agricultural Code of California) Oranges, except bloods, tangerines, mandarins, Jaffas, Javas, and Parson Browns, shall not be considered mature unless the juice contains soluble solids, as determined by a Brix scale hydrometer, equal to or in excess of eight parts to every part of acid contained in the juice (the acidity of the juice to be calculated as citric acid without water of crystallization), and unless, before picking, they have attained at least twenty-five per cent of characteristic color. In view of differences in climatic and growing conditions prevailing north of the Tehachapi Mountains in California which results in some navel oranges grown in certain districts of that area having at maturity a lower ratio of soluble solids to acid than matured navel oranges grown in the area south of the Tehachapi Mountains, navel oranges produced in the area north of the Tehachapi Mountains which are at least seventy per cent colored at the time of picking shall be considered mature if the juice contains soluble solids as determined by a Brix scale hydrometer, equal to or in excess of six and one-half parts to every part of acid contained in the juice. No oranges may be accelerated in color unless the juice contains soluble solide, as determined by a Brix scale hydrometer, equal to or in excess of eight parts to every part of acid contained in the juice (the acidity of the juice to be calculated as citric acid without water of crystallization).

"Twenty-five per cent of characteristic color" in the case of oranges is defined as that color designated by the Munsell color notation as hue one and fourteen one-hundredths green-yellow, value five and twenty-three one-hundredths chroma four and three-tenths (1.14GY5.23/4.3), and "seventy per cent colored" as hue three yellow, value six, chroma five (3Y6/5). Oranges shall be considered as having exceeded twenty-five or seventy per cent color if the average hue of the surface of each fruit is numerically less than one and fourteen-hundredths green-yellow or three yellow respectively, regardless of the other components of the color. (Amended by Ch. 285, Stats. 1933; amended by Ch. 329, Sts.1937)

2. Florida -

Section 4. (State of Florida Citrus Inspection Bureau, ~~Annual Report Season of 1937-38)~~. That within the purpose and meaning of this Act, oranges shall be deemed to be mature only when the ratio of total soluble solids of the juice thereof to the anhydrous citric acid is not less than eight to one (8 to 1). -Chapter No. 17779 - Laws of Florida, ~~Acts of 1937~~.

3. Texas -

H.B. No. 47 (~~In the House.—January 11, 1935, read first time and referred to Committee on Agriculture; January 25, 1935, reported favorably, as amended; January 25, 1935, sent to printer.)~~ Sec. 3.

(e) That within the meaning and purpose of this Act, oranges shall be deemed to be mature when the juice thereof contains not less than eight (8%) per centum of the total soluble solids to each part of the anhydrous citric acid.

(f) In determining the total soluble solids, the Brix hydrometer shall be used and the reading of the hydrometer corrected for temperature shall be considered as the per centum of the total soluble solids. Anhydrous citric acid shall be determined by titration of the juice, using standard alkali and phenolphthalein as the indicator, the total acidity being calculated as anhydrous citric acid.

(g) All citrus fruit not conforming to the above standards shall be deemed and held to be immature within the meaning of this act.

B. Grapefruit

1. California-

797. (Extracts from the Agricultural Code of California). Grapefruit shall not be considered mature unless the juice contains soluble solids, as determined by a Brix scale hydrometer, equal to or in excess of five and one-half parts to every part of acid contained in the juice (the acidity of the juice to be calculated as citric acid without water of crystallization), and unless, before picking, they have attained at least twenty-five per cent of characteristic color. Grapefruit which are at least seventy per cent colored at the time of picking shall be considered mature if the juice contains soluble solids, as determined by a Brix scale hydrometer, equal to or in excess of five parts to every part of acid contained in the juice. No grapefruit may be accelerated in color unless the juice contains soluble solids, as determined by a Brix scale hydrometer, equal to or in excess of five and one-half parts to every part of acid contained in the juice (the acidity of the juice to be calculated as citric acid without water of crystallization). In view of differences in climatic conditions prevailing south and east of San Gorgonio Pass, which results in the grapefruit grown in that area having, at maturity, a higher percentage of soluble solids to acid than the mature grapefruit grown in the area north and west of said San Grogonio Pass, grapefruit produced in the area south and east of San Gorgonio Pass shall not be considered mature unless the juice contains soluble solids equal to or in excess of six parts to every part of acid contained in the juice (the acidity of the juice to be calculated as citric acid without water of crystal-

lization), and has attained, before picking, at least twenty-five per cent of characteristic yellow color. In the event that the maturity standard fixed for that area south and east of San Gorgonio Pass should be declared void it is the intent of the Legislature that the other maturity standards prescribed in this section shall prevail. Grapefruit produced outside of this state under climatic conditions similar to those prevailing in the area south and east of San Gorgonio Pass and offered for sale in this State shall meet the same maturity standard as those prescribed for grapefruit produced south and east of said San Gorgonio Pass.

"Twenty-five per cent characteristic yellow color" in the case of grapefruit is defined as that color designated by the Munsell color notation as hue three and three one-hundredths green-yellow, value five and sixty-one one-hundredths, chroma, four and nine-tenths (3.03 GY 5.61/4.9), and "seventy per cent colored" as hue seven yellow, value seven, chroma six (7Y7/6). Grapefruit shall be considered as having exceeded twenty-five or seventy per cent color if the average hue of the surface of each fruit is numerically less than three and three one-hundredths green-yellow and seven yellow, respectively, regardless of the other components of the color.

2. Florida -

(The Citrus Maturity Law - Chapter No. 17779 Laws of Florida, ~~Acts of 1937~~). Section 3. That within the purpose and meaning of this Act, grapefruit shall be deemed to be mature only when the total soluble solids of the juice thereof is not less than seven (7) percent, and when the ratio of total soluble solids of the juice thereof to the anhydrous citric acid is as set forth in sub-section A of this Section, and when the juice contents of said grapefruit is not less than the minimum requirement for the respective sizes of said grapefruit as set forth hereinafter in sub-section B of this Section.

(A) The minimum ratios of total soluble solids of the juice of said grapefruit to the anhydrous citric acid are as follows:

1. When the total soluble solids of the juice is not less than seven (7) percent and not more than eight (8) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be seven to one (7 to 1).

2. When the total soluble solids of the juice is not less than eight (8) percent and not more than nine (9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and one-half to one (6.50 to 1).

3. When the total soluble solids of the juice is not less than nine (9) percent and not more than nine and one-tenth (9.1) percent the minimum ratio of the total soluble solids to anhydrous citric acid shall be six and forty-five hundredths to one (6.45 to 1).

4. When the total soluble solids of the juice is not less than nine and one-tenth(9.1)percent and not more than nine and two-tenths (9.2) percent the minimum ratio of the total soluble solids to anhydrous citric acid shall be six and four-tenths to one (6.4 to 1).

5. When the total soluble solids of the juice is not less than nine and two-tenths (9.2) percent and not more than nine and three-tenths (9.3) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and thirty-five hundredths to one (6.35 to 1).

6. When the total soluble solids of the juice is not less than nine and three-tenths (9.3) percent and not more than nine and four-tenths (9.4) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and thirty hundredths to one (6.30 to 1).

7. When the total soluble solids of the juice is not less than nine and four-tenths (9.4) percent and not more than nine and five-tenths (9.5) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and twenty-five hundredths to one (6.25 to 1).

8. When the total soluble solids of the juice is not less than nine and five-tenths (9.5) percent and not more than nine and six-tenths (9.6) percent of the minimum ratio of total soluble solids to anhydrous citric acid shall be six and twenty hundredths to one (6.20 to 1).

9. When the total soluble solids of the juice is not less than nine and six-tenths (9.6) percent and not more than nine and seven-tenths (9.7) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and fifteen hundredths to one (6.15 to 1).

10. When the total soluble solids of the juice is not less than nine and seven-tenths (9.7) percent and not more than nine and eight-tenths (9.8) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and ten hundredths to one (6.10 to 1).

11. When the total soluble solids of the juice is not less than nine and eight-tenths (9.8) percent and not more than nine and nine-tenths (9.9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six and five hundredths to one (6.05 to 1).

12. When the total soluble solids of the juice is not less than nine and nine-tenths (9.9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be six to one (6 to 1).

3. Texas

(H.B. 47) Section 3. That within the purpose and meaning of this act, pomelos (grapefruit) shall be deemed to be mature only when the ratio of total soluble solids of the juice thereof to anhydrous citric acid is as follows:
(a) When the total soluble solids of the juice is not less than nine per cent (9%), the minimum ratio of total soluble solids to the anhydrous citric acid shall be seven and two tenths to one (7.2-1).

(b) When the total soluble solids of the juice is not less than ten percent (10%), the minimum ratio of total soluble solids to the anhydrous citric acid shall be seven to one (7 - 1).

(c) When the total soluble solids of the juice is not less than eleven per cent (11%), the minimum ratio of total soluble solids to the anhydrous citric acid shall be six and eight-tenths to one (6.8-1).

(d) When the total soluble solids of the juice is not less than eleven and one-half per cent (11.5%), the mimimum ratio of total soluble solids to the anhydrous citric acid shall be six and one-half to one (6.5 - 1).

(f) In determining the total soluble solids, the Brix hydrometer shall be used and the reading of the hydrometer corrected for temperature shall be considered as the per centum of the total soluble solids. Anhydrous citric acid shall be determined by titration of the juice, using standard alkali and phenolphthalein as the indicator the total acidity being calculated as anhydrous citric acid.

(g) All citrus fruit not conforming to the above standards upon official test shall be deemed and held to be immature within the meaning of this act.

C. Tangerines

1. Florida

(Chapter No. 17779 Laws of Florida, Acts of 1937) Section 5. That within the purpose and meaning of this Act, tangerines shall be deemed to be mature only when the ratio of the total soluble solids of the juice thereof to the anhydrous citric acid is not less than seven and one-half to one (7.50 -1).

II. Grading Laws

A. United States Standards for Oranges.

1. California and Arizona

INTRODUCTION

The tolerances for the standards are on a container basis. However, individual packages in any lot may vary from the specified tolerances as stated below, provided the averages for the entire lot, based on sample inspection, are within the tolerances specified.

For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified, except that when the package contains 15 specimens or less, individual packages may contain not more than double the tolerance specified.

For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified, provided at least one specimen which does not meet the requirements shall be allowed in any one package.

GRADES

U. S. Fancy shall consist of oranges of similar varietal characteristics, which are mature, well colored, firm, well formed, of smooth texture for the variety, free from decay, broken skins which are not healed, hard or dry skins, growth cracks, bruises (except those incident to proper handling and packing), dryness or mushy condition, and from injury caused by split, rough, wide or protruding navels, sprayburn, fumigation, ammoniation, creasing, scars, green spots, scale, sunburn, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

U. S. No. 1 shall consist of oranges of similar varietal characteristics, which are mature, firm, well formed, of fairly smooth texture for the variety, free from decay, broken skins which are not healed, hard or dry skins, growth cracks, bruises (except those incident to proper handling and packing), and from damage caused by dryness or mushy condition, split, rough, excessively wide or protruding navels, spray-burn, fumigation, ammoniation, creasing, scars, green spots, scale, sunburn, dirt or other foreign materials, disease, insects, or mechanical or other means. Each fruit shall be well colored except Valencia oranges, which shall be at least fairly well colored.

Stems shall be properly clipped.

<u>U. S. No. 2</u> shall consist of oranges of similar varietal characteristics, which are mature, fairly well colored, fairly firm, which may be slightly misshapen but not excessively rough which are free from decay, broken skins which are not healed, hard or dry skins, growth cracks, and from serious damage caused by bruises, dryness or mushy condition, split or protruding navels, sprayburn, fumigation, ammoniation, creasing, scars, green spots, scale, sunburn, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

<u>U. S. No. 3</u> shall consist of oranges of similar varietal characteristics, which are mature, which may be slightly spongy, misshapen, rough, but not seriously lumpy, which are free from decay, broken skins which are not healed, hard or dry skins, from serious damage by growth cracks, bruises, dryness or mushy condition, and from very serious damage caused by split navels, sprayburn, fumigation, ammoniation, creasing, scars, green spots, scale, sunburn, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

<u>Unclassified</u> shall consist of oranges which have not been classified in accordance with any of the foregoing grades. The term "unclassified" is not a grade within the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot.

<u>TOLERANCES</u>

In order to allow for variations incident to proper grading and handling in each of the foregoing grades, not more than 10 percent, by count, of the fruit in any container may be below the requirements of the specified grade, but not more than one-twentieth of this amount, or one-half of 1 percent, shall be allowed for decay at shipping point; provided that an additional tolerance of 2-1/2 percent, or a total of not more than 3 percent, shall be allowed for decay enroute or at destination. In addition, not more than 10 percent, by count, of the fruit in any container may not meet the requirements relating to color.

2. Florida and Texas -

Standards for Citrus Fruits

(Taken from "Texas Standards for Fruits and Vegetables and Fruit and Vegetable Containers, 1935"). These standards apply only to the common or sweet orange group, grape-

fruit, and tangerines, and other varieties belonging to the Mandarin Group. These standards to not apply to California and Arizona citrus fruits for which separate U. S. standards are issued.

The tolerances for the standards are on a container basis. However, individual packages in any lot may vary from the specified tolerances as stated below, provided the averages for the entire lot, based on sample inspection, are within the tolerances specified.

For a tolerance of 10 per cent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified.

For a tolerance of less than 10 per cent, individual packages in any lot may contain not more than double the tolerance specified, provided at least one specimen which does not meet the requirements shall be allowed in any one package.

Grades

U. S. Fancy shall consist of citrus fruits of similar varietal characteristics, which are well colored, firm, well formed, mature, and of smooth texture; free from ammoniation, bird pecks, bruises, buckskin, creasing, cuts which are not healed, decay, growth cracks, scab, split navels, sprayburn, and undeveloped or sunken segments, from injury by black or unsightly discoloration, green spots, rough and excessively wide or protruding navels, scale, scars, thorn scratches, and from damage, caused by dirt or other foreign materials, dryness, sprouting, sunburn, disease, insects or mechanical or other means.

In this grade not more than one-tenth of the surface in the aggregate may be affected with discoloration.

U. S. No. 1 shall consist of citrus fruits of similar varietal characteristics which are fairly well colored, firm, well formed, mature, and of fairly smooth texture; free from bruises, buckskin, cuts which are not healed, decay, growth cracks, sprayburn, undeveloped or sunken segments, and from damage caused by ammoniation, bird pecks, black or unsightly discoloration, creasing, dirt or other foreign materials, dryness, green spots, scab, scale, scars, split or rough or protruding navels, sprouting, sunburn, thorn scratches, disease, insects or mechanical or other means.

In this grade not more than one-third of the surface in the aggregate may be affected with discoloration.

U. S. No. 1 Bright. The requirements for this grade are the same as for U. S. No. 1 except that in this grade no fruit may have more than one-tenth of its surface in the aggregate affected with discoloration.

U. S. No. 1 Russet. The requirements for this grade are the same as for U. S. No. 1 except that, in this grade, at least 75 per cent, by count, of the fruit shall have in excess of one-third of the surface in the aggregate affected with discoloration.

U. S. No. 2. shall consist of citrus fruits of similar varietal characteristics which are mature but may be only slightly colored, fairly firm, slightly misshapen and slightly rough, but which are free from bruises, cuts which are not healed, decay, growth cracks, and from serious damage caused by ammoniation, bird pecks, black or unsightly discoloration, buckskin, creasing, dirt or other foreign materials, dryness, green spots, scab, scale, scars, split, rough or protruding navels, sprayburn, sprouting, sunburn, thorn scratches, undeveloped or sunken segments, disease, insects, mechanical or other means.

In this grade not more than 35 per cent, by count, of the fruit may have in excess of one-third of the surface in the aggregate affected with discoloration.

U. S. Combination Grade. Any lot of citrus fruits may be designated "U. S. Combination" when not less than 40 per cent, by count, of the fruits in each container meet the requirements of U. S. No. 1 grade and the remainder U. S. No. 2 grade, provided that not more than 25 per cent, by count, of the fruits in any container may have in excess of one-third of the surface in the aggregate affected with discoloration.

U. S. No. 2 Bright. The requirements for this grade are the same as for U. S. No. 2 except that in this grade no fruit may have more than one-tenth of its surface in the aggregate affected with discoloration.

U. S. No. 2 Russet. The requirements for this grade are the same as for U. S. No. 2 except that, in this grade, at least 75 per cent, by count, of the fruit shall have in excess of one-third of the surface in the aggregate affected with discoloration.

Unclassified shall consist of citrus fruits which are not graded in conformity with the foregoing grades.

Tolerances for Preceding Grades

In order to allow for variations incident to proper grading and handling in each of the foregoing grades, the following tolerances are provided as specified:

U. S. Fancy. Not more than 10 per cent, by count, of the fruit in any container may be below the requirements of this grade, but not more than one-fourth of this tolerance, or $2\frac{1}{2}$ per cent, shall be allowed for damage by black or unsightly discoloration, and not more than one-twentieth of this tolerance, or one-half of one per cent, shall be allowed for decay at shipping point; provided, that a total tolerance of not more than 3 per cent shall be allowed for decay en route or at destination. No part of any tolerance shall be allowed for wormy fruit or worm holes.

U. S. No. 1, U. S. No. 1 Bright, U. S. No. 2 Bright Grades. Not more than 10 per cent, by count, of the fruit in any container may be below the requirements of the grade other than for discoloration, but not more than one-twentieth of this tolerance, or one-half of one per cent, shall be allowed for decay at shipping point; provided, that a total tolerance of not more than 3 per cent shall be allowed for decay en route or at destination. In addition, not more than ten per cent, by count, of the fruit in any container may not meet the requirements relating to discoloration, but not more than one-fourth of this tolerance, or $2\frac{1}{2}$ per cent, shall be allowed for serious damage by black or unsightly discoloration. No part of any tolerance shall be allowed for wormy fruit or worm holes.

U. S. No. 2. Not more than 10 per cent, by count, of the fruit in any container may be below the requirements of this grade other than for discoloration, but not more than one-twentieth of this tolerance, or one-half of one per cent, shall be allowed for decay at shipping point; provided, that a total tolerance of not more than 3 per cent shall be allowed for decay en route or at destination. In addition, not more than 10 per cent, by count, of the fruit in any container may not meet the requirements relating to discoloration. No part of any tolerance shall be allowed for wormy fruit or worm holes.

U. S. Combination Grade. Not more than 10 per cent, by count, of the fruit in any container may be below the requirements of this grade, but not more than one-twentieth of this tolerance, or one-half of one per cent shall be allowed for decay at shipping point; provided, that a total tolerance of not more than 3 per cent shall be allowed for decay en route or at destination. No part of any tolerance shall be allowed to reduce, for the lot as a whole, the percentage of U. S. No. 1 required in the combination, or to increase the percentage of fruit having in excess of one-third of the surface

in the aggregate affected with discoloration which is permitted in the combination, but individual containers may have not more than a total of 10 per cent less than the percentage of U. S. No. 1 required or specified and/or in excess of the percentage of discolored fruits specified, provided that the entire lot averages within the percentages specified. No part of any tolerance shall be allowed for wormy fruit or worm holes.

<u>U. S. No. 1 Russet, U. S. No. 2 Russet Grades.</u> Not more than 10 per cent, by count, of the fruit in any container may be below the requirements of the grade, but not more than one-twentieth of this amount, or one-half of one per cent, shall be allowed for decay at shipping point; provided, that a total tolerance of not more than 3 per cent shall be allowed for decay en route or at destination. No part of any tolerance shall be allowed to reduce the percentage of fruit having in excess of one-third of the surface in the aggregate affected with discoloration which is required in these grades, but individual containers may have not more than 10 per cent less than the percentage required, provided that the entire lot averages within the percentage specified. No part of any tolerance shall be allowed for wormy fruit or worm holes.

B. United States Standards for Grapefruit

1. California and Arizona

INTRODUCTION

The tolerances for the standards are on a container basis. However, individual packages in any lot may vary from the specified tolerances as stated below, provided the averages for the entire lot, based on sample inspection, are within the tolerances specified.

For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified, except that when the package contains 15 specimens or less, individual packages may contain not more than double the tolerance specified.

For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified, provided at least one specimen which does not meet the requirements shall be allowed in any one package.

GRADES

<u>U. S. Fancy</u> shall consist of grapefruit of similar varietal characteristics, which are mature, well colored, firm, well formed, of smooth texture for the variety, fairly thin skinned, free from decay, broken skins which are not

healed, hard or dry skins, bruises (except these incident to proper handling and packing), dryness or mushy condition, and from injury caused by sprayburn, fumigation, ammoniation, scars, green spots, scale, sunburn, sprouting, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

U. S. No. 1 shall consist of grapefruit of similar varietal characteristics, which are mature, fairly well colored, firm, well formed, of fairly smooth texture for the variety, and not excessively thick skinned, free from decay, broken skins which are not healed, hard or dry skins, bruises (except those incident to proper handling and packing), and from damage caused by dryness or mushy condition, sprayburn, fumigation, ammoniation, scars, green spots, scale, sunburn, sprouting, dirt or other foreign materials, disease, insects, or mechanical or other means.

Stems shall be properly clipped.

U. S. No. 2 shall consist of grapefruit of similar varietal characteristics, which are mature, slightly colored, fairly firm, which may be slightly misshapen but not excessively rough, which are free from decay, broken skins which are not healed, hard or dry skins, and from serious damage caused by bruises, dryness or mushy condition, sprayburn, fumigation, ammoniation, scars, green spots, scale, sunburn, sprouting, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

U. S. No. 3 shall consist of grapefruit of similar varietal characteristics, which are mature, slightly colored, which may be slightly spongy, misshapen, rough, but not seriously lumpy, which are free from decay, broken skins which are not healed, hard or dry skins, from serious damage by bruises, dryness or mushy condition, and from very serious damage caused by sprayburn, fumigation, ammoniation, scars, green spots, scale, sunburn, sprouting, dirt or other foreign materials, disease, insects or mechanical or other means.

Stems shall be properly clipped.

Unclassified shall consist of grapefruit which have not been classified in accordance with any of the foregoing grades. The term "Unclassified" is not a grade within the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot.

TOLERANCES

In order to allow for variations incident to proper grading and handling in each of the foregoing grades, not more than 10 percent, by count, of the fruit in any container may be below the requirements of the specified grade, but not more than one-twentieth of this amount, or one-half of 1 percent, shall be allowed for decay at shipping point; provided that an additional tolerance of 2-1/2 percent, or a total of not more than 3 percent, shall be allowed for decay enroute or at destination. In addition, not more than 10 percent, by count, of the fruit in any container may not meet the requirements relating to color.

2. Florida and Texas

(Same as A-2 under II, Grading Laws)

C. U. S. Standards for Tangerines and Mandarin Oranges

(Included in A-2)

D. U. S. Standards for Lemons -

(U. S. Department of Agriculture, Bureau of Agr'l Economics - "U. S. Standards for Lemons" ~~effective Jan. 2, 1938~~)

INTRODUCTION

The tolerances for the standards are on a container basis. However, except when applying the tolerances for "Standards for Export", individual packages in any lot may vary from the specified tolerances as stated below, provided the averages for the entire lot, based on sample inspection, are within the tolerances specified.

For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified, except that when the package contains 15 specimens or less, individual packages may contain not more than double the tolerance specified.

For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified, provided at least one specimen which does not meet the requirements shall be allowed in any one package.

GRADES

U. S. No. 1 shall consist of lemons which are firm, fairly well formed, not abnormally rough, which are free from decay, internal evidence of Alternaria development, broken skins which are not healed, hard or dry skins, growth cracks, internal decline, red blotch, bruises (except those incident to proper handling and packing,) membranous stain, or other internal discoloration, and from damage caused by dryness or mushy condition, sprayburn, fumigation, exanthema, scars, green spots, scale, sunburn, hollow core, peteca, scab, melanose, dirt or other foreign materials, disease, insects or mechanical or other means.

The lemons shall be at least fairly well colored, provided that lots of lemons which meet all the requirements of this grade except as to color shall be designated as "U. S. No. 1 Green" if the lemons in each container are of a full green color; or as "U. S. No. 1 Mixed Color" if the lemons in each container fail to meet the color requirements of either "U. S. No. 1" or "U. S. No. 1 Green".

The fruit shall have a juice content of not less than 25 percent, by volume, except when designated as"U. S. No. 1 Green for Export". When so designated the lemons shall have a juice content of not less than 22-1/2 percent unless otherwise specified.

Stems shall be properly clipped.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any container may not meet the color reruirements. In addition, not more than 10 percent, by count, of the fruit in any container, may be below the remaining requirements of this grade, but not more than one-half of this tolerance, or 5 percent, shall be allowed for decay, internal evidence of Alternaria development, internal decline, broken skins which are not healed, growth cracks, or defects causing serious damage, but not more than one-tenth of this amount, or one-half of one percent, shall be allowed for lemons affected by decay in State of origin. A total tolerance of not more than 3 percent shall be allowed for lemons affected by decay upon arrival in other States than that of their origin.

<u>U. S. No. 2</u> shall consist of lemons which are not soft or excessively spongy, not badly deformed, not excessively rough, which are free from decay, internal evidence of Alternaria development, broken skins which are not healed, hard or dry skins, red blotch, and from serious damage caused by bruises, membranous stain, or other internal discoloration, dryness or mushy condition, sprayburn, fumigation, exanthema, scars, green spots, scale, sunburn, hollow core, peteca, growth cracks, internal decline, scab, melanose, dirt or other foreign materials, disease, insects or mechanical or other means.

The lemons shall be at least fairly well colored, provided that lots of lemons which meet all the requirements of this grade except as to color shall be designated as "U. S. No. 2 Green" if the lemons in each container are of a full green color; or as "U. S. No. 2 Mixed Color" if the lemons in each container fail to meet the color requirements of either "U. S. No. 2" or "U. S. No. 2 Green".

The fruit shall have a juice content of not less than 25 percent, by volume, except when designated as "U. S. No. 2 Green for Export". When so designated the lemons shall have a juice content of not less than 22-1/2 percent unless otherwise specified.

Stems shall be properly clipped.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any container may not meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any container, may be below the remaining requirements of this grade but not more than one-half of this tolerance, or 5 percent, shall be allowed for decay, internal evidence of Alternaria development, or internal decline, but not more than one-fifth of this amount, or 1 percent, shall be allowed for lemons affected by decay in State of origin. A total tolerance of not more than 3 percent shall be allowed for lemons affected by decay upon arrival in other States than that of their origin.

U. S. No. 3 shall consist of lemons which may be soft but not seriously spongy, seriously deformed or seriously lumpy; which are free from decay, internal evidence of Alternaria development, broken skins which are not healed, hard or dry skins, and from serious damage caused by growth cracks, internal decline, bruises, dryness or mushy condition, and from very serious damage caused by red blotch, membranous stain, or other internal discoloration, sprayburn, fumigation, exanthema, scars, green spots, scale, sunburn, hollow core, peteca, scab, melanose, dirt or other foreign materials, disease, insects or mechanical or other means.

The lemons shall be at least fairly well colored, provided that lots of lemons which meet all the requirements of this grade except as to color shall be designated as "U. S. No. 3 Green" if the lemons in each container are of a full green color; or as "U. S. No. 3 Mixed Color" if the lemons in each container fail to meet the color requirements of either "U. S. No. 3" or "U. S. No. 3 Green".

The fruit shall have a juice content of not less than 20 percent, by volume, except when designated as "U. S. No. 3 Green for Export". When so designated there shall be no requirements for juice content.

Stems shall be properly clipped.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any container may not meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any container may be below the remaining requirements of this grade, but not more than one-tenth of this tolerance, or 1 percent, shall be allowed for lemons affected by decay in State of origin. A total tolerance of not more than 3 per cent shall be allowed for lemons affected by decay upon arrival in other States than that of their origin.

U. S. Combination Grade. A combination of U. S. No. 1 and U. S. No. 2 lemons may be packed. Combinations other than this are not provided for in connection with the United States lemon grades. A combination of U. S. No. 1 and U. S. No. 2 lemons may be designated "U. S. Combination" grade when at least 75 per cent of the lemons in any container meet the requirements of U. S. No. 1.

In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any container may not meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any container may be below the remaining requirements of the lower grade in the combination, but not more than one-tenth of this tolerance, or 1 percent, shall be allowed for lemons affected by decay in State of origin. No part of the above tolerance shall be allowed to reduce, for the lot as a whole, the 75 percent of U. S. No. 1 lemons required in the combination, but individual containers may have not less than 65 percent of the higher grade. A total tolerance of not more than 3 percent shall be allowed for lemons affected by decay upon arrival in other States than that of their origin. This 3 percent tolerance may be used to reduce the percentage of lemons of the higher grade required in the combination, provided the affected fruits meet the requirements of the higher grade in other respects.

Unclassified shall consist of lemons which have not been classified in accordance with any of the foregoing grades. The term "Unclassified" is not a grade within the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot.

III. Juice Content Laws

A. Grapefruit

1. Florida -
(State of Florida Citrus Inspection Bureau, Annual Report ~~Season of 1957-58~~, pages 22 and 23).

(B) The minimum juice contents of the juice of the respective sizes of said grapefruit are as follows, each size being designated by the commercial number assigend to it, based on the number of grapefruit of said size packed commercially in a standard Florida packed box of grapefruit containing two compartments each having inside dimensions of twelve inches by twelve inches by twelve inches:

1. A grapefruit of size 28 shall contain not less than 335 cubic centimeters of juice.

2. A grapefruit of size 36 shall contain not less than 310 cubic centimeters of juice.

3. A grapefruit of size 46 shall contain not less than 295 cubic centimeters of juice.

4. A grapefruit of size 54 shall contain not less than 270 cubic centimeters of juice.

5. A grapefruit of size 64 shall contain not less than 245 cubic centimeters of juice.

6. A grapefruit of size 70 shall contain not less than 225 cubic centimeters of juice.

7. A grapefruit of size 80 shall contain not less than 215 cubic centimeters of juice.

8. A grapefruit of size 96 shall contain not less than 190 cubic centimeters of juice.

9. A grapefruit of size 126 shall contain not less than 160 cubic centimeters of juice.

10. A grapefruit of size 150 shall contain not less than 140 cubic centimeters of juice.

The tests of the jüice contents of grapefruit hereunder shall be based upon the average maximum amount of liquid contents which can be extracted from the flesh and pulp of not less than three average individual specimens of said grapefruit of any given size. The Florida Citrus Commission shall by proper rules and regulations to be issued hereunder prescribe

the manner and method of drawing of said samples and of conducting said tests. The skin and rind shall be removed before the liquid contents are extracted, and the remaining portion of the fruit shall be enclosed within a porous cloth before the juice is extracted therefrom for the purpose of permitting an efficient extraction of said juice, and the mechanical juice extractor or fruit press known as "Juicy Fruit Press" manufactured by O. P. Schriver Company of Cincinnati, Ohio, shall be used in such process of extraction with the strength of one man applied thereto. Provided, that by the regulation of the Florida Citrus Commission any other mechanical fruit press or juice extractor of similar construction and equal efficiency may be used in such process of extraction.

B. Oranges

1. Only when color is added is law effective. (See Color-Added Law in IV, Sec. 6, Paragraph 18)

C. Lemons

(Included in U. S. Standards for Lemons)

U.S. No. 1 - The fruit shall have a juice content of not less than 25 percent, by volume, except when designated as "U. S. No. 1 Green for Export". When so designated the lemons shall have a juice content of not less than 22-1/2 percent unless otherwise specified.

U. S. No. 2 - The fruit shall have a juice content of not less than 25 percent, by volume, except when designated as "U. S. No. 2 Green for Export". When so designated the lemons shall have a juice content of not less than 22-1/2 percent unless otherwise specified.

U. S. No. 3 - The fruit shall have a juice content of not less than 20 percent, by volume, except when designated as "U. S. No. 3 Green for Export". When so designated there shall be no requirements for juice content.

IV. Color Added Law

A. Florida -

(Chapter No. 17778, Laws of Florida, ~~Acts of 1937~~)

Section 5. It shall be unlawful for any person to treat any citrus fruit with, or apply thereto, any coloring matter which has not first received the approval of the Commissioner as herein provided.

Section 6. That it shall be unlawful for any person to use on citrus fruits or apply thereto any coloring matter unless such fruit passes the requirement of the State maturity tests, and, in addition thereto, oranges shall pass the following minimum requirements for total soluble solids of the juice thereof and for ratio of total soluble solids of the juice thereof to anhydrous citric acid:

1. When the total soluble solids of the juice is not less than nine (9) percent of the minimum ratio of total soluble solids to anhydrous citric acid shall be eight and one-half to one (8.50 to 1).

2. When the total soluble solids of the juice is not less than eight and nine-tenths (8.9) percent and not more than nine (9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be eight and sixty hundredths to one (8.60 to 1).

3. When the total soluble solids of the juice is not less than eight and eight-tenths (8.8) percent and not more than eight and nine-tenths (8.9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be eight and seventy hundredths to one (8.70 to 1).

4. When the total soluble solids of the juice is not less than eight and seven-tenths (8.7) percent and not more than eight and eight-tenths (8.8) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be eight and eighty hundredths to one (8.80 to 1).

5. When the total soluble solids of the juice is not less than eight and six-tenths (8.6) percent and not more than eight and seven-tenths (8.7) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be eight and ninety hundredths to one (8.90 to 1).

6. When the total soluble solids of the juice is not less than eight and five-tenths (8.5) percent and not more than eight and six-tenths (8.6) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine to one (9 to 1).

7. When the total soluble solids of the juice is not less than eight and four-tenths (8.4) percent and not more than eight and five-tenths (8.5) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and ten hundredths to one (9.10 to 1).

8. When the total soluble solids of the juice is not less than eight and three-tenths (8.3) percent and not more than eight and four-tenths (8.4) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and twenty hundredths to one (9.20 to 1).

9. When the total soluble solids of the juice is not less than eight and two-tenths (8.2) percent and not more than eight and three-tenths (8.3) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and thirty hundredths to one (9.30 to 1).

10. When the total soluble solids of the juice is not less than eight and one-tenth (8.1) percent and not more than eight and two-tenths (8.2) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and forty hundredths to one (9.40 to 1).

11. When the total soluble solids of the juice is not less than eight (8) percent and not more than eight and one-tenths (8.1) percent the minimum ratio ot total soluble solids to anhydrous citric acid shall be nine and fifty hundredths to one (9.50 to 1).

12. When the total soluble solids of the juice is not less than seven and nine-tenths (7.9) percent and not more than eight (8) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and sixty hundredths to one (9.60 to 1).

13. When the total soluble solids of the juice is not less than seven and eight-tenths (7.8) percent and not more than seven and nine-tenths (7.9) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and seventy hundredths to one (9.70 to 1).

14. When the total soluble solids of the juice is not less than seven and seven-tenths (7.7) percent and not more than seven and eight-tenths (7.8) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and eighty hundredths to one (9.80 to 1).

15. When the total soluble solids of the juice is not less than seven and six-tenths (7.6) percent and not more than seven and seven-tenths (7.7) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be nine and ninety hundredths to one (9.90 to 1).

16. When the total soluble solids of the juice is not less than seven and five-tenths (7.5) percent and not more than seven and six-tenths (7.6) percent the minimum ratio of total soluble solids to anhydrous citric acid shall be ten to one (10 to 1).

17. When the ratio of total soluble solids to anhydrous citric acid shall be not less than ten and one-half to one (10.50 to 1) there shall be no requirement for soluble solids.

18. Coloring matter shall not in any case be applied to any oranges when the ratio of total soluble solids to anhydrous citric acid is less than eight and one-half to one (8.50 to 1). Likewise, coloring matter shall not in any case be applied to any oranges unless the juice content thereof shall be at least four and one-half gallons to each standard packed box, the juice to be extracted by hand, without mechanical pressure.

In determining the total soluble solids of citrus fruit within the purpose and meaning of this Act, the Brix hydrometer shall be used and the reading of the hydrometer corrected for temperature shall be considered as the per centum of the total soluble solids. Anhydrous citric acid shall be determined by titration of the juice, using standard alkali and Phenolphthalein as the indicator, the total acidity being calculated as anhydrous citric acid.

~~V.~~ Advertising Regulations

A. Grapefruit

1. Florida -

Section 6. That there is hereby levied and imposed an excise tax of three cents on each standard packed box of grapefruit grown in the State of Florida.

B. Oranges

1. Florida -

Section 6. That there is hereby levied and imposed an excise tax of one cent on each standard packed box of oranges grown in the State of Florida.

C. Tangerine -

1. Florida -

Section 6. That there is hereby levied and imposed an excise tax of five cents on each standard packed box of tangerines grown in the State of Florida.

V.
~~VI.~~ Freezing Damage

A. California

795. (Extracts from the Agr'l Code of California). Citrus fruits shall be mature and free from decay; free from serious damage due to freezing, drying at the stem or blossom end (resulting from causes other than freezing), splits, bruises, or punctures, and in addition lemons shall be free from serious damage due to sunburn and internal decline. Packed citrus fruit shall be virtually uniform in size. Damage by drying at the stem or blossom end of all citrus fruits (resulting from causes other than freezing), and by internal decline or drying due to sunburn of lemons, is not serious unless twenty per cent or more of the pulp shows staining, drying or desiccation. Damage from freezing to any one fruit is not serious unless (a) it causes a drying or desiccation in twenty per cent or more of the exposed pulp as shown on a transverse cut through the center or (b) it causes, before the drying process develops, a water-soaked appearance, or evidence of previous water soaking, or the presence of crystals or crystalline deposit, on the two surface membranes of each of two or more segments as shown on the separation of two or more segments of a section, which section shall not be less

than one inch or more than one and one-half inches in thickness, obtained from the central portion of the fruit by cutting off a portion of each end--such evidence of freezing injury to show for the entire length but not necessarily the entire area of the surface membranes.

The percentage of serious damage to citrus fruits in containers, or in bulk, may be established by inspection of a representative sample which shall consist of not less than one-hundred fruits. Damage caused by splits, bruises, or punctures in any citrus fruit is not serious if the injury is well healed and free from mold or decay. Damage other than drying, caused by sunburn to lemons, is not serious unless it affects the edible portion of the fruit.

With the exception of serious damage caused by freezing, not more than ten per cent, by count, of the citrus fruit in any one container or bulk lot may be below these requirements, but with the exception of serious damage by sunburn and internal decline of lemons, or by drying at the stem or blossom end of all citrus fruits (resulting from causes other than freezing), not to exceed one-half of this tolerance shall be allowed for any one cause. In the case of serious damage by freezing injury, when the determination of serious freezing damage is based on a water-soaked appearance, or evidence of previous water soaking, or the presence of crystals or crystalline deposit, on the surface membranes of the segments, as herein defined, and before the drying process develops, not more than fifteen percent, by count, of the citrus fruit in any one container or bulk lot may be below these requirements. After the drying process develops and the determination of serious freezing damage is based on a transverse cut, as herein defined, not more than fifteen per cent, by count, of the citrus fruit in any one container or bulk lot may be below these requirements, but not to exceed one-third of this tolerance shall be allowed for citrus fruits which show a drying or desiccation in forty per cent or more of the exposed pulp, as shown on a transverse cut through the center. The total tolerance for a combination of defects shall not exceed the tolerance permitted for any one cause by more than five per cent, by count.

No lot of citrus fruit failing to conform to the requirements because of serious damage caused by freezing injury may be mixed or blended with other lots of citrus fruit which conforms to these requirements, resulting in the concealment of inferior fruit, thereby reducing the percentage of defective fruits in the seriously damaged lots to within the tolerance which is permitted for errors in grading only.

Any packed, wrapped citrus fruit which has been in storage or after being shipped fails to meet the requirements of this standard only by reason of brown rot, blue mold, or green mold which has occurred after packing, shall not be held for violation of the provisions of this chapter on account of such deterioration.

B. Florida
1. (Juice content laws provide for this).

VII. ~~Containers~~
A. California

Oranges, grapefruit and tangerines when packed shall be in standard containers numbers 31 or 33, and lemons when packed shall be in standard containers numbers 35, 36, 37 and 38. Other size containers may be used if conspicuously marked on the outside of the end which bears any marks intended to describe the contents of such container, in letters not less than one-half inch in height, "irregular size container."

829. The standard containers and packs for the following fruits, nuts and vegetables hereinafter specified shall be as follows: Oranges, grapefruit and tangerines, numbers 31, or 33; lemons, numbers 35, 36, 37, or 38.

		Dimensions		
No.	Name	Depth inside in inches	Width inside in inches	Length inside in inches
31	Standard orange box	$11\frac{1}{2}$	$11\frac{1}{2}$	24-5/8
33	Half orange box	5-3/4	$11\frac{1}{2}$	24-5/8
35	Standard lemon box	10	13	25-5/8
36	Half lemon box	5	13	25-5/8
37	Jumbo lemon box	11-1/8	$13\frac{1}{2}$	25-5/8
38	Half jumbo lemon box	5-9/16	$13\frac{1}{2}$	25-5/8

B. Florida - (See text, p. 84)

C. Texas -
Bill 623: Only the following containers shall be used for grapefruit and oranges:

1. The Standard Box. The dimensions of the standard box shall be 12 x 12 x 12 inches for each one-half box, inside measurements.

2. The One-Half Standard Box. The dimensions of the one-half standard box (or strap box) shall be 12 x 12 x 6 inches for each one-half of said box, inside measurements.

3. The One Compartment Box. The dimensions of the one compartment box shall be 12 x 12 x 24 inches, inside measurements.

4. Standard Bushel Basket. The standard bushel basket shall contain not less than 2150.4 cubic inches in the basket proper, regardless of the manner in which the lid is made.

5. Other closed containers of a capacity of not more than 1-3/5 bushels, with a cubical space not exceeding 3456 cubic inches in the container proper, regardless of the shape of the containers and the manner they are closed.

VIII. Markings

A. Florida

1. Color Added -

Regulation No.16 - page 126

6. Each fruit which has been colored under said Act shall have on the skin thereof a label statement plainly showing it to be so colored. Such label statement shall consist of the words "COLOR ADDED" in type not less than five thirty-seconds (5-32) inch in height and an overall length of not less than one inch, and type not used in the words "COLOR ADDED" shall not extend into, between or at either end of the words "COLOR ADDED", and wherever any other word or words appear in such label statement in addition to the words "COLOR ADDED" such word or words must be under and not over the words "COLOR ADDED" and of the type not larger than the type used in the words "COLOR ADDED".

All packing boxes and containers containing fruit so colored shall bear thereon in a conspicuous manner in bold face type not less than three-fourths (3/4) inch in height the words "COLOR ADDED". Such words shall be printed on or form a part of the main label affixed to or stamped on such packing boxes or containers, or shall be stamped on the same end or side of such packing boxes or containers that such main label is affixed to or stamped thereon.

2. Grade -

Section 2. Each citrus fruit sold or offered for sale or offered for shipment or being shipped by common carrier or otherwise in bulk shall have on the skin thereof a label statement plainly showing its grade or, if it is a cull, it shall be labeled on the skin thereof "CULL". Such label statement shall be in type not less than 5-32 inch in height and an overall length of not less than one inch. Shipping in bulk means the shipping of any citrus fruit loose without in any manner placing such citrus fruit in any container other than the car, truck, boat, or other vehicle used in transporting such fruit. When citrus fruit is sold, offered for sale, or offered for shipment, or being shipped by common carrier or otherwise, enclosed in a container which meets the standards adopted by the Florida Citrus Commission, it shall be sufficient if the grade of said citrus fruit, or in the case of "CULLS", the word "CULL" shall be stamped upon said closed container in a conspicuous place in bold faced type not less than 3/4 inch in height. Such grade, or the word "CULLS" in the case of culls, shall be printed on or form a part of the main label affixed to or stamped on such container, or shall be stamped on the same end or side of such container that the main label is affixed or stamped thereon. In the case of stamping the grade and name and address on bags, or on the tag attached to the bag, as required herein, the size of the type shall be not less than three-eights (3/8) inch in height and shall be plainly legible. In the case of seamless bags of 4-5 bushel capacity the tag, instead of being sewn, may be securely affixed to the bag with not less than three metal staples at least three eights (3/8) inch in length, the tag to be folded over the selvage edge of the bag in such manner that the staples will pass through the tag on both sides of the bag. When fruit is shipped in consumer size, namely, 1-16 or 1-10 box size bags, the shipper shall be allowed the privilege of substituting for the required white cloth tag or marking on the bag itself an insert tag which shall be inserted in the bag with the fruit and carry the required grade, name and address information and which must be legible from the outside. Provided, that the shipper or seller using closed containers adopted as standard by the Florida Citrus Commission shall have the privilege of using, instead of marking the grade on the container, either labels, brands or trademarks which shall represent specific State grades or specific United States Grades and which shall be registered with the Florida Citrus Commission. In all cases where culls are shipped in a closed container the word "CULLS" shall be clearly marked upon the container as above set forth. No citrus fruit shall be sold, offered for sale or offered for shipment or be shipped by common carrier or otherwise except in bulk or in containers adopted by the Florida Citrus Commission.

The name and address of the shipper shipping said citrus fruit, unless the same are clearly and legibly set forth in the label used on said container, and the point of origin of the shipment, if it be a point other than the address of the shipper and if the same does not appear clearly and legibly on the label or elsewhere in permanent form on the container, shall all be stamped on the container immediately below the label, if such container carries a label and otherwise they shall be stamped in a similar place and manner as the grade is customarily stamped, in bold face type not less than three eights (3/8) inch in height.

B. California

Closed containers of unpacked citrus fruit and all containers of packed citrus fruit shall bear upon them in plain sight and in plain letters on one outside end; the name of the person who first authorized the packing of the citrus fruit or the name under which such packer is engaged in business, together with a sufficiently explicit address to permit ready location of such packer; the number and average diameter of the citrus fruit in the container, or the cubical content of the container; and in the case of oranges, the name of the variety, if known, and when not known the words "unknown variety" or "seedlings."

IX. Standard Packing

A. California and Arizona

1. Oranges -

Oranges shall be uniform in size and arranged in the boxes according to the approved and recognized methods. The fruit shall be tightly packed and the wrap show at least one-half twist. Each fruit shall be enclosed in its individual wrapper. Each box of oranges shall show a minimum bulge of 1-1/4 inches.

"Uniform in size" means that not more than 10 percent, by count, of the fruit in any container, may be one standard size larger or smaller than the standard size for the count packed.

Example of Standard Size Orange - The standard size orange for a 200 count is that size orange which will pack tightly 200 oranges of uniform size when packed according to the approved and recognized method.

In order to allow for variations incident to proper packing, not more than 5 percent of the boxes in any lot may not meet the requirements for the standard pack.

2. Grapefruit -

Grapefruit shall be fairly uniform in size and arranged in the boxes according to the approved and recognized methods. The fruit shall be tightly packed and the wrap show at least one-half twist. Each fruit shall be enclosed in its individual wrapper. Each box of grapefruit shall show a minimum bulge of 2 inches.

"Fairly uniform in size" means that not more than 5 per cent, by count, of the fruit in any container, may be more than one standard size larger or smaller than the standard size for the count packed.

Example of Standard Size Grapefruit - The standard size grapefruit for a 64 count is that size grapefruit which will pack tightly 64 grapefruit of uniform size when packed according to the approved and recognized method.

In order to allow for variations incident to proper packing, not more than 5 percent of the boxes in any lot, may not meet the requirements for the standard pack.

3. Lemons -

Lemons shall be fairly uniform in size and arranged in the boxes according to the approved and recognized methods. The fruit shall be tightly packed and each fruit shall be fairly well enclosed ih its individual wrapper. Button ends only shall bepacked against the end pieces or center partitions of the box.

Each box of lemons shall show a minimum bulge of 1-1/4 inches.

"Fairly uniform in size" means that not more than 5 percent, by count, of the fruit in any container, may be more than one standard size larger or smaller than the standard size for the count packed.

Example of Standard Size Lemon. The standard size of a 300 size is that size which will pack tightly 300 lemons of uniform size when packed according to the approved and recognized methods.

In order to allow for variations incident to proper packing, not more than 5 percent of the boxes in any lot may not meet the requirements for the standard pack.

B. Florida

The term "Standard packed box" means 1-3/5 bushels of citrus fruit whether in bulk or containers.

C. Texas

Fruit shall be fairly uniform in size and arranged in the boxes according to the approved and recognized methods. The fruit shall be tightly packed and the wrap show at least one-half twist. Each fruit shall be enclosed in its individual wrapper, except that in packs of oranges and tangerines of a size 250 and smaller only fruit in the top and bottom layers and fruit exposed at the sides of the box shall be required to be wrapped.

Each box of oranges shall show a minimum bulge of $1\frac{1}{4}$ inches. With grapefruit the minimum bulge shall be 2 inches, except that the boxes packed with grapefruit of a size 80 or smaller need only show a bulge of $1\frac{1}{2}$ inches. Boxes of tangerines shall show a minimum bulge of 3/4 inch.

"Fairly uniform in size" means that there is not excessive variation in diameters of the fruits in any container and that oranges and grapefruits are within the range given in Table CIX for the various packs.

Table I
G R A P E F R U I T

(No Records Previous to October, 1917)

State	Oct.	Nov.	Dec.	Total
California	-	-	2	2
Florida	8	87	296	391
Total United States	8	87	298	393

Table II
O R A N G E S

State	Oct.	Nov.	Dec.	Total
Alabama	-	1	1	2
Arizona	-	1	19	20
California	-	529	1551	2080
Florida	-	198	3137	3335
Total United States	-	729	4708	5437

Table III
L E M O N S

State	Oct.	Nov.	Dec.	Total
California	-	119	282	401

Table IV
GRAPEFRUIT

(Oldest Complete Record - 1918)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	-	-	-	-	-	-	-	-	-	1	4	4	9
California	7	1	11	25	77	72	29	9	1	15	88	17	352
Florida	354	488	551	637	403	88	1	1	142	1034	915	675	5289
Total United States	361	489	562	662	480	160	30	10	143	1050	1007	696	5650

Table V
ORANGES

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	-	-	-	-	-	-	-	-	-	-	4	2	6
Arizona	-	-	1	-	-	-	-	-	-	-	34	36	71
California	1189	994	2120	2526	1914	1474	354	640	697	425	1025	2825	16183
Florida	2226	806	703	212	111	24	1	-	-	544	3272	4285	12184
Total United States	3415	1800	2824	2738	2025	1498	355	640	697	969	4335	7148	28444

Table VI
LEMONS

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California	218	350	593	667	961	1056	234	550	895	616	649	724	6913

Table VII

GRAPEFRUIT

Car-Lots Shipments in 1932

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	36	35	47	50	37	-	-	-	-	13	48	37	303
California													
Northern District	-	1	1	-	-	-	-	-	-	-	-	-	2
Southern District	54	47	71	95	236	425	134	107	81	50	75	23	1398
Central District	-	2	2	22	13	25	2	-	1	1	2	-	70
Imperial Valley	17	17	16	26	44	3	-	-	-	17	15	21	176
Florida	2740	2464	2589	2587	1176	94	3	-	69	887	1427	1619	15655
Texas	981	1211	1379	-	-	-	-	-	17	444	701	413	5146
Total United States	3828	3777	4105	2780	1506	547	139	107	168	1412	2268	2113	22750
TRUCK SHIPMENTS													
Texas	390	484	197	-	-	-	-	-	13	120	259	294	1757
IMPORTS													
Cuba	-	1	-	-	-	2	-	51	152	77	9	4	296
Puerto Rico	5	6	9	6	7	36	32	93	407	166	15	7	789
Total Imports	5	7	9	6	7	38	32	144	559	243	24	11	1085

Table VIII

ORANGES AND SATSUMAS

1932

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	-	-	-	-	-	-	-	-	-	12	175	41	228
Arizona	20	-	-	-	-	-	-	-	-	-	30	60	110
California													
Northern District	51	6	6	-	-	1	-	-	-	-	144	243	451
Southern District	3374	4924	6374	5011	5164	4887	5907	4751	4848	4562	1398	519	51723
Central District	254	112	125	1202	1044	89	10	-	-	1	3527	2381	8745
Imperial Valley	-	-	-	3	-	-	-	-	-	-	-	-	3
Florida	3258	3421	2926	2467	1705	267	1	-	-	40	1452	4166	19703
Louisiana	26	9	2	-	1	-	-	-	-	2	43	23	106
Mississippi	-	-	-	-	-	-	-	--	-	6	37	5	48
Texas	24	30	71	-	-	-	-	-	-	2	7	24	158
Total United States	7007	8502	9508	8683	7914	5244	5918	4751	4848	4625	6813	7462	81275

TRUCK SHIPMENTS

Texas	9	14	4	-	-	-	-	-	-	2	5	8	42

Table VIII-Continued

ORANGES AND SATSUMAS

IMPORTS

1932

Country	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cuba	-	1	2	-	3	1	-	-	-	-	1	-	8
Puerto	6	14	6	2	-	-	-	-	-	5	9	11	53
Other Countries	-	-	-	-	-	-	-	-	-	-	-	65	65
Total Imports	6	15	8	2	3	1	-	-	-	5	10	76	126

Table IX
L E M O N S

1932

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	-	-	-	-	-	-	-	-	-	2	2	-	4
California													
Northern District	20	20	14	5	10	9	-	-	-	-	17	15	110
Southern District	941	977	1780	1541	2423	2354	1775	979	611	523	560	654	15118
Central District	56	52	63	15	12	3	-	-	2	64	97	110	474
Total United States	1017	1049	1857	1561	2445	2366	1775	979	613	589	676	779	15706

I M P O R T S

Italy	16	44	12	7	22	27	53	11	35	16	26	42	311
Mexico	-	-	-	-	-	-	-	1	-	-	-	-	1
Other Countries	3	-	5	-	-	1	-	-	1	-	-	-	10
Total Imports	19	44	17	7	22	28	53	12	36	16	26	42	322

Table X
T A N G E R I N E S

1932

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Southern District	-	-	2	-	-	-	-	-	-	-	-	-	2
Florida	926	493	50	-	-	-	-	-	-	1	232	911	2613
Louisiana	1	4	-	-	-	-	-	-	-	-	1	-	6
Total United States	927	497	52	-	-	-	-	-	-	1	233	911	2621

Table XI
M I X E D C I T R U S F R U I T S

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	5	-	1	-	-	-	-	-	-	-	-	-	6
California													
Southern District	73	92	136	115	147	337	243	183	126	93	30	33	1608
Central District	14	-	4	13	5	-	2	-	-	-	31	33	102
Florida	1723	1444	940	729	285	53	-	-	-	68	890	1964	8096
Louisiana	23	9	-	-	-	-	-	-	-	1	20	45	98
Texas	85	119	147	-	-	-	-	-	-	8	35	69	463
Total United States	1923	1664	1228	857	437	390	245	183	126	170	1006	2144	10373

Table XII

G R A P E F R U I T

Carlots Shipments in 1 9 3 3
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	57	68	67	35	32	49	1	-	-	5	30	51	395
California													
Southern District	24	40	27	108	133	105	131	92	38	24	52	46	820
Central District	1	2	1	30	8	-	-	-	-	-	-	4	46
Imperial Valley	26	23	27	28	17	-	-	-	-	12	29	18	180
Florida	2099	1990	2783	2402	2165	1248	427	205	687	1698	1849	1647	19200
Texas	715	361	28	-	-	-	-	-	149	34	135	365	1787
Total United States	2922	2484	2933	2603	2355	1402	559	297	874	1773	2095	2131	22428

T R U C K S

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	-	-	-	-	-	-	-	-	149	223	280	280	932
Texas	347	293	73	-	-	-	-	-	57	112	155	201	1238
Totals	347	293	73	-	-	-	-	-	206	335	435	481	2170

I M P O R T S

(Over)

Table XII-Continued

IMPORTS

1933

Country	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cuba	-	-	-	2	-	-	-	23	74	4	-	-	103
Puerto Rico	1	8	5	3	2	-	3	33	339	114	72	50	630
Total Imports	1	8	5	5	2	-	3	56	413	118	72	50	733

Table XIII

O R A N G E S A N D S A T S U M A S

Car-Lot Shipments in 1933
Including boat shipments reduced to car-lot equivalents

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	16	-	-	-	-	-	-	-	-	-	2	61	79
California													
Northern District	7	6	2	-	-	-	-	-	-	-	-	1	16
Southern District	3263	3875	4572	4623	4670	5308	5206	4616	4960	5062	3487	450	50092
Central District	133	1	-	280	766	639	30	-	-	-	504	2873	5226
Florida	3943	3562	3893	3477	3657	2429	338	9	2	221	2342	4119	27992
Georgia	-	-	-	-	-	-	-	-	-	-	3	-	3
Louisiana	7	-	-	-	-	-	-	-	-	4	19	9	39
Mississippi	-	-	-	-	-	-	-	-	-	-	1	-	1
Texas	20	47	2	-	-	-	-	-	-	-	-	12	81
Total United States	7389	7491	8469	8380	9093	8376	5574	4625	4962	5287	6358	7525	83529

T R U C K S H I P M E N T S
Incomplete

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	-	-	-	-	-	-	-	-	18	208	769	1580	2575
Texas	10	32	38	-	-	-	-	-	9	30	85	193	397

(Over)

Table XIII-Continued

TRUCK SHIPMENTS
(Continued)

Totals	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	10	32	38	-	-	-	-	-	27	238	854	1773	2972

IMPORTS

Country													
Cuba	-	-	2	-	-	-	-	-	-	-	-	-	2
Puerto Rico	4	6	1	-	-	-	-	-	-	6	19	4	40
Other Countries	-	-	-	-	-	-	-	-	-	-	-	48	48
Total Imports	4	6	3	-	-	-	-	-	-	6	19	52	90

Table XIV

L E M O N S

Car-Lots Shipments in 1933
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	2	-	-	-	-	-	-	-	-	-	-	-	2
Southern District	865	533	976	1014	2293	2770	1494	1291	928	999	788	751	14702
Central District	30	1	3	-	-	-	-	-	-	-	37	85	156
Total United States	897	534	979	1014	2293	2770	1494	1291	928	999	825	836	14860

I M P O R T S

Country	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Italy	50	24	37	15	36	104	67	19	2	-	-	-	354
Total Imports	50	24	37	15	36	104	67	19	2	-	-	-	354

Table XV

TANGERINES

Car-lots Shipments in 1933

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	846	638	372	35	-	-	-	-	-	2	469	1059	3421
Louisiana	8	-	-	-	-	-	-	-	-	-	-	-	8
Total United States	854	638	372	35	-	-	-	-	-	2	469	1059	3429

TRUCK SHIPMENTS
(Incomplete)

Florida	-	-	-	-	-	-	-	-	-	-	31	327	358
Total United States	-	-	-	-	-	-	-	-	-	-	31	327	358

IMPORTS

Puerto Rico	-	-	-	-	-	-	-	-	-	-	-	1	1
Total Imports	-	-	-	-	-	-	-	-	-	-	-	1	1

Table XVI

M I X E D   C I T R U S   F R U I T S

Car-lots Shipments in 1933
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	1	-	-	-	-	-	-	-	-	-	1	6	8
California													
Southern District	123	136	190	161	181	158	202	194	131	78	54	9	1617
Central District	7	-	1	1	2	-	-	-	-	3	4	28	46
Florida	1483	1201	1092	728	633	293	40	8	7	148	992	1975	8600
Louisiana	33	3	1	-	-	-	-	-	-	1	18	13	69
Texas	95	60	8	-	-	-	-	-	2	1	6	22	194
Total United States	1742	1400	1292	890	816	451	242	202	140	231	1075	2053	10534

I M P O R T S

Cuba	-	-	3	-	-	-	-	-	-	-	-	-	3

Table XVII

GRAPEFRUIT

Car-Lots Shipments in 1934
(Including boat shipments reduced to car-lot equivalents)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	96	100	209	171	154	93	-	-	-	84	93	103	1103
California													
Southern District	105	96	137	172	188	335	269	166	57	27	22	29	1603
Central District	-	20	36	69	78	21	-	-	-	3	-	-	227
Imperial Valley	56	40	54	57	50	2	-	-	-	7	13	14	293
Florida	2006	1918	2161	1922	915	122	1	2	630	1788	1953	1622	15040
Texas	610	196	117	4	-	-	-	-	10	109	629	617	2292
Total United States	2873	2370	2714	2395	1385	573	270	168	697	2018	2710	2385	20558
TRUCK SHIPMENTS													
Arizona	-	-	-	1	1	-	-	-	-	-	1	3	6
California													
Central District	-	-	-	-	-	-	-	-	-	-	-	1	1
Southern District	-	-	-	4	5	4	9	10	11	6	4	5	58
Imperial Valley	-	-	-	-	-	-	-	-	-	-	1	1	2
Florida	218	187	236	197	118	-	-	-	114	309	378	295	2052

(over)

Table XVII-Continued
GRAPEFRUIT

Truck Shipments (Continued)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Texas	264	242	205	35	-	-	-	-	19	145	232	226	1368
Total United States	482	429	441	237	124	4	9	10	144	460	616	531	3487
IMPORTS													
Cuba	-	-	-	-	-	-	1	89	228	-	-	-	318
Puerto Rico	41	42	80	103	216	74	35	50	138	77	10	6	872
Total Imports	41	42	80	103	216	74	36	139	366	77	10	6	1190

Table XVIII

ORANGES AND SATSUMAS

Car-Lots Shipments **in** 1934
(**Including** boat shipments **reduced** to car-lot equivalents)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	-	-	-	-	-	-	-	-	-	11	97	11	119
Arizona	36	2	14	11	-	-	-	-	-	-	33	44	140
California													
Northern District	-	-	-	-	-	-	-	-	-	-	50	65	115
Southern District	2558	2864	5461	4613	4103	5990	4873	5185	4394	2918	232	1113	44304
Central District	725	1	5	401	1743	224	-	-	-	30	3891	3340	10360
Imperial Valley	-	7	2	-	-	-	-	-	-	-	-	-	9
Florida	4876	4025	5256	3853	2377	260	-	-	1	1204	3909	3857	29617
Louisiana	3	1	-	1	-	--	-	-	-	7	22	16	50
Mississippi	-	-	-	-	-	-	-	-	-	21	100	4	125
Texas	7	14	29	2	-	-	-	-	-	-4	19	24	99
Total United States	8204	6914	10767	8881	8223	6474	4873	5185	4395	4195	8353	8474	84938

Table XVIII-Continued

ORANGES AND SATSUMAS

Truck Shipments in 1934
(Incomplete)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	-	-	-	-	-	-	-	-	-	-	7	14	21
Central District	-	-	-	1	8	3	1	-	-	3	32	39	87
Southern District	-	-	-	131	145	93	53	63	65	53	51	71	725
Florida	890	918	963	693	400	-	-	-	8	376	1019	1834	7101
Texas	179	178	195	31	-	-	-	-	1	75	190	253	1102
Total United States	1069	1096	1158	856	553	96	54	63	74	507	1299	2211	9036

IMPORTS

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cuba	-	1	-	-	-	-	-	-	-	-	-	-	1
Puerto Rico	3	6	6	3	3	3	-	-	1	8	20	8	61
Other Countries	-	-	1	-	1	-	1	-	-	-	8	66	77
Total Imports	3	7	7	3	4	3	1	-	1	8	28	74	139

Table XIX

LEMONS

Car-Lots Shipments in 1934
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	-	-	-	-	-	-	-	-	-	1	4	4	9
California													
Northern District	-	-	-	-	-	-	-	2	-	5	9	7	23
Southern District	905	674	1183	1217	2525	2764	2688	1506	665	940	730	935	16732
Central District	109	45	34	2	-	-	8	6	-	25	87	127	443
Total United States	1014	719	1217	1219	2525	2764	2696	1514	665	971	830	1073	17207

IMPORTS

Italy	17	5	8	7	19	56	8	-	-	-	-	6	126

Table XX

T A N G E R I N E S

Car-Lots Shipments in 1934
(Including boat shipments reduced to car lots)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	915	374	63	1	-	-	-	-	-	2	785	870	3010
Texas	-	-	-	-	-	-	-	-	-	-	-	1	1
Total United States	915	374	63	1	-	-	-	-	-	2	785	871	3011

T R U C K S H I P M E N T S 1934

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	186	103	19	-	-	-	-	-	-	-	157	283	748

Table XXI

M I X E D   C I T R U S   F R U I T S

Car-Lots Shipments in 1934
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	5	-	2	1	-	-	1	-	-	5	2	6	22
California													
Southern District	81	121	170	169	110	302	287	232	108	50	12	46	1688
Central District	14	-	-	2	12	1	-	-	-	-	35	23	87
Florida	1604	1272	1150	573	204	17	1	-	1	177	907	1631	7537
Louisiana	25	13	11	-	-	-	-	-	-	7	17	34	107
Texas	37	31	22	-	-	-	-	-	-	4	34	24	152
Total United States	1766	1437	1355	745	326	320	289	232	109	243	1007	1764	9593

Table XXII

C I T R U S F R U I T S

Grapefruit

Car-Lots Shipments in 1935
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	109	139	131	181	140	28	3	-	-	78	162	147	1118
California													
Southern District	46	41	38	63	247	357	341	225	102	64	75	40	1639
Central District	-	-	28	61	9	15	4	2	-	3	2	2	126
Imperial Valley	21	28	41	38	16	1	-	-	-	7	48	21	221
Florida	1780	1550	2140	2853	1875	862	161	5	297	1436	1492	1014 *	15465
Texas	1193	999	678	29	-	-	-	-	-	494	1033	655	5081
Total United States	3149	2757	3056	3225	2287	1263	509	232	399	2082	2812	1879	23650

* -- Includes 11 light cars (250 crates) two light cars used as one.

Table XLIII-Continued

GRAPEFRUIT

Truck Shipments in 1935
(Incomplete)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	1	3	2	2	4	-	-	-	-	-	5	3	20
California													
Central District	1	2	2	2	3	2	2	-	-	-	-	-	14
Southern District	5	4	4	5	10	13	14	10	13	15	5	6	104
Imperial Valley	-	-	-	1	-	-	-	-	-	-	-	-	1
Florida	282	284	371	325	122	-	-	-	95	306	342	294	2421
Texas	305	342	349	88	-	-	-	-	-	148	236	283	1751
Total United States	594	635	728	423	139	15	16	10	108	469	588	586	4311
IMPORTS													
Canada	-	-	-	-	-	-	-	1	-	-	-	-	1
Cuba	-	1	-	-	-	-	-	33	128	-	-	-	162
Puerto Rico	4	5	8	72	74	120	118	98	208	93	33	12	845
Total Imports	4	6	8	72	74	120	118	132	336	93	33	12	1008

Table XXIII

ORANGES AND SATSUMAS

Car-Lots Shipments in 1935

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	9	13	39	4	-	-	-	-	-	-	70	92	227
California													
Northern District	3	-	-	1	4	-	-	-	-	-	1	77	86
Southern District	4084	5001	5634	6210	5517	5870	7371	5819	5661	5130	2339	1138	59774
Central District	1204	126	166	1397	2303	547	20	23	25	22	1601	3126	10560
Imperial Valley	-	11	-	-	-	-	-	-	-	-	-	-	11
Florida	3194	3338	3391	2702	2095	1010	140	8	-	486	2584	3724 *	22672
Louisiana	5	1	-	-	-	-	-	-	-	-	5	11	22
Texas	33	60	2	-	-	-	-	-	-	-	10	67	172
Total United States	8532	8550	9232	10314	9919	7427	7531	5850	5686	5638	6610	8235	93524

* -- Includes 72 light cars (250 crates) - two light cars used as one car.

Table XXIII - Continued

ORANGES AND SATSUMAS

Truck Shipments in 1935

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	7	2	-	2	5	-	-	-	-	-	-	14	30
Central District	30	18	3	6	36	6	2	-	-	-	22	62	185
Southern District	156	195	233	273	229	134	135	98	107	146	104	91	1901
Imperial Valley	-	1	-	-	-	-	-	-	-	-	-	-	1
Florida	845	934	944	485	151	-	-	-	17	241	805	1486	5908
Texas	246	247	77	2	-	-	-	-	-	32	131	345	1080
Total United States	1284	1397	1257	768	421	140	137	98	124	419	1062	1998	9105
IMPORTS													
Canada	-	-	4	5	-	4	-	3	5	4	1	15	41
Cuba	-	2	-	-	-	-	-	-	-	-	-	-	2
Puerto Rico	7	1	2	-	-	-	-	-	-	4	3	2	19
Other Countries	-	-	-	-	-	-	-	-	-	-	2	103	105
Total Imports	7	3	6	5	-	4	-	3	5	8	6	120	167

Table XXIV

L E M O N S

Car-Lots Shipments in 1935
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	3	1	9	4	-	-	-	-	-	-	4	18	39
Southern District	1260	1413	1781	2591	3221	3191	3176	1984	734	975	658	821	21805
Central District	156	79	41	11	1	-	2	-	-	5	78	190	563
Total United States	1419	1493	1831	2606	3222	3191	3178	1984	734	980	740	1029	22407

I M P O R T S

Canada	-	1	-	-	-	-	-	-	-	-	-	-	1
Italy	5	-	2	-	-	-	-	-	-	-	-	-	7
Total Imports	5	1	2	-	-	-	-	-	-	-	-	-	8

Table XXV

T A N G E R I N E S

Car-Lots Shipments in 1935
Including boat shipments reduced to car-lot equivalents

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Southern District	-	-	1	-	-	-	-	-	-	-	-	-	1
Florida	637	274	62	-	-	-	-	-	-	3	362	1204*	2542
Louisiana	1	-	-	-	-	-	-	-	-	-	-	-	1
Total United States	638	274	63	-	-	-	-	-	-	3	362	1204	2544

T R U C K S H I P M E N T S

(Incomplete)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	117	79	33	-	-	-	-	-	-	-	57	270	556

* -- Includes 5 light cars (250 crates); two light cars used as one.

Table XXVI

M I X E D   C I T R U S   F R U I T S

Car-Lots Shipments in 1935
Including boat shipments reduced to car-lots equivalents but not movement by motor trucks

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	3	4	3	1	-	1	-	-	-	2	14	20	48
California													
Southern District	151	196	229	137	97	252	444	357	177	140	62	55	2297
Central District	7	4	2	10	19	-	-	-	-	-	6	27	75
Imperial Valley	-	1	-	-	-	-	-	-	-	-	-	2	3
Florida	1010	930	817	546	230	89	7	-	-	82	503	1871*	6085
Louisiana	18	9	4	-	-	-	-	-	-	2	17	43	93
Texas	59	67	4	-	-	-	-	-	-	12	44	108	294
Total United States	1248	1211	1059	694	346	342	451	357	177	238	646	2126	8895

I M P O R T S

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cuba	-	2	-	-	-	-	-	-	-	-	-	-	2

* -- 62 light cars. 2 light cars equal to one heavy car.

Table XXVII

G R A P E F R U I T

Car Lots Shipment in 1936

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	313	331	[illegible]	317	304	74	-	-	32	191	100	98	[illegible]
California													
Northern District	-	-	-	1	-	-	-	-	-	-	-	-	1
Southern District	97	129	197	198	354	466	212	38	33	14	15	10	[illegible]
Central District	-	7	66	111	56	3	-	-	1	4	-	1	[illegible]
Imperial Valley	84	105	113	105	86	6	-	-	-	32	37	24	[illegible]
Florida Total	1461	1904	2092	2001	1007	110	-	20	1277	1313	2100	2005	[illegible],790
Heavy	1443	1878	2049	1905	967	108	-	20	1223	1731	2019	1915	[illegible],402 x
Light	31	53	33	76	40	3	-	-	54	45	141	120	[illegible] *
Texas	972	515	110	-	-	-	-	-	-	750	1240	[illegible]	[illegible]
Total United States	2897	3001	2399	2733	1007	539	212	98	1343	[illegible]	[illegible]	3737	[illegible] #

x -- Heavy Cars (over 250 crates)
* -- Light Cars (250 crates - two light cars used as one car)
\# -- Includes 1327 cars for emergency relief ([illegible] heavy and 110 light)

Table XXVII--Continued

G R A P E F R U I T

Truck Shipments (Incomplete)

Reduced to Car Lots

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	4	1	-	4	2	2	-	-	-	3	4	2	22
California													
Central District	-	-	-	2	1	-	-	-	-	-	-	-	3
Southern District	7	9	6	12	7	7	9	8	4	1	1	2	73
Imperial Valley	-	1	-	-	-	-	-	-	-	1	-	1	3
Florida	303	356	385	304	172	-	-	-	147	272	340	303	2347
Texas	317	259	156	10	-	-	-	-	-	226	355	412	1735
Total	631	626	547	332	182	9	9	8	151	503	700	720	4483

I M P O R T S

Cuba	-	-	-	-	-	-	5	209	136	-	-	-	350
Puerto Rico	15	19	66	111	84	87	23	24	90	15	5	2	541
Other Countries	-	-	1	2	2	2	-	1	1	-	-	-	9
Total	15	19	67	113	86	89	28	234	229	15	5	2	900

Imports obtained from official records of United States Department of Commerce.

Table XXVIII

O R A N G E S   A N D   S A T S U M A S

Car-Lot Shipments in 1936
Including boat shipments reduced to car-lot equivalents

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	-	-	-	-	-	-	-	-	-	8	7	-	15.
Arizona	-	2	10	8	8	14	-	-	-	-	138	34	214
California													
Northern District	21	-	-	-	-	-	-	-	-	-	31	94	146
Southern District	2632	3541	4825	5670	4758	6297	6403	4786	4888	2955	226	594	47,575
Central District	577	32	107	304	1550	734	20	17	13	19	3703	3590	10,696
Imperial Valley	-	9	7	-	-	-	-	-	-	-	-	-	16
Florida Total	3565	4086	4446	3723	2418	512	1	-	1	1783	3739	3788	38,062
Heavy	3481	3972	4308	3627	2369	510	1	-	1	1710	3643	3478	37,094 x
Light	168	228	276	192	98	4	-	-	1	145	193	663	1,937 *
Louisiana	1	-	-	-	-	-	-	-	-	2	7	9	19
Mississippi	-	-	-	-	-	-	-	-	-	12	31	-	43
Texas	98	143	3	-	-	-	-	-	-	37	277	163	721
Total United States	6894	7813	9398	9705	8734	7387	6424	4803	4902	4816	8139	8272	87,307 #

Includes 168 cars for emergency relief.

Table XXVIII-Continued
O R A N G E S

Truck Shipments (Incomplete)

1936

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	5	1	-	-	1	-	-	-	-	-	-	22	29
Central District	18	5	2	-	5	6	1	1	-	-	15	46	99
Southern District	154	119	116	169	91	68	71	52	70	41	45	59	1055
Florida	780	908	981	665	336	-	-	-	21	401	787	1554	6433
Texas	304	268	91	1	-	-	-	-	-	186	392	598	1840
Total United States	1261	1301	1190	835	433	74	72	53	91	628	1239	2279	9456

I M P O R T S

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Canada	7	2	-	2	-	-	-	-	2	2	-	3	18
Cuba	-	-	-	-	-	-	-	-	-	-	-	1	1
Japan	4	10	9	12	14	12	16	8	6	9	4	69	173
Puerto Rico	2	1	1	-	-	-	-	-	-	-	-	2	6
Total Imports	13	13	10	14	14	12	16	8	8	11	4	75	198

Table XXIX

L E M O N S

Car-Lots Shipments in 1936
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	-	-	-	-	-	-	-	-	-	-	3	-	3
California													
Northern District	21	1	-	-	1	-	-	1	-	-	9	12	45
Southern District	870	1001	1476	1387	2569	2593	2596	1507	1069	867	665	614	17214
Central District	50	7	12	2	1	-	17	17	11	53	107	97	374
Total United States	941	1009	1488	1389	2571	2593	2613	1525	1080	920	784	723	17636

I M P O R T S

Italy	32	60	23	29	55	45	19	-	-	-	1	-	264
Other Countries	-	-	2	1	-	1	-	2	2	-	-	-	8
Total	32	60	25	30	55	46	19	2	2	0	1	0	272

Imports obtained from official records of United States Department of Commerce. Converted into car-lots equivalents on basis of 24,000 pounds minimum car-lots loading as per Consolidated Freight Classification.

Table - XXX

TANGERINES

Car-Lots Shipments in 1936

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Southern District	2	3	1	-	-	-	-	-	-	-	-	5	11
Florida Total	969	345	34	2	-	-	-	-	-	2	696	1575	3623
Heavy	965	345	34	2	-	-	-	-	-	2	694	1560	3602 x
Light	8	1	-	-	-	-	-	-	-	-	4	29	42 *
Total United States	971	348	35	2	0	0	0	0	0	2	696	1580	3634

TRUCK SHIPMENTS
(Incomplete)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida	145	87	18	-	-	-	-	-	-	2	93	376	721

x -- Heavy cars (over 250 crates)

* -- Light cars (250 crates - two light cars used as one car)

Table XXXI

MIXED CITRUS FRUITS

Car-Lots Shipments in 1936
(Including boat shipments reduced to car-lots equivalents but not movement by motor trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	6	3	10	6	8	2	-	-	-	8	13	11	67
California													
Southern District	178	255	301	366	211	443	383	197	129	84	33	46	2626
Central District	5	-	1	-	3	-	-	-	-	-	48	40	97
Imperial Valley	-	-	1	-	-	-	-	-	-	-	1	5	7
Florida Total	1284	1068	883	576	242	37	-	-	4	273	1096	1738	7201
Heavy	1192	977	790	520	215	36	-	-	3	220	968	1526	6447 x
Light	183	182	187	111	54	3	-	-	1	106	256	425	1508 *
Louisiana	24	8	1	-	-	-	-	-	-	3	22	34	92
Texas	231	141	3	-	-	-	-	-	-	122	370	236	1103
Total United States	1728	1475	1200	948	464	482	383	197	133	490	1583	2110	11193

x -- Heavy cars (over 250 crates)

* -- Light cars (250 crates - two light cars used as one car)

Table XXXII

GRAPEFRUIT

Car-Lots Shipments in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	181	41	102	107	161	32	1	-	-	160	115	87	987
California													
Southern District	33	10	16	32	76	157	166	109	77	43	25	28	772
Central District	1	4	6	-	3	2	-	-	1	4	-	-	21
Imperial Valley	44	54	71	39	-	-	-	-	-	31	25	18	282
Florida Total	3269	2563	2140	2995	2053	235	2	-	788	1815	1095	1244	18199
Heavy	3167	2470	2081	2943	2028	232	2	-	773	1795	1072	1217	17780 x
Light	204	186	118	104	49	6	-	-	31	39	47	54	838 *
Texas	2703	2421	4939	239	-	-	-	-	-	1231	1386	1924	14843
Total United States	6231	5093	7274	3412	2293	426	169	109	866	3284	2646	3301	35104 #

x -- Heavy Cars (over 250 crates)
* -- Light Cars (250 crates - two light cars used as one car)
# -- Includes 3442 cars for emergency relief. (3391 Heavy and 102 Light Cars)

Table [illegible]-Continued

GRAPEFRUIT

Truck Shipments Incomplete in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	4	2	-	1	1	-	-	-	-	1	2	1	12
California													
Southern District	3	-	1	3	3	3	4	2	2	3	2	1	27
Central District	1	-	-	-	-	-	-	-	-	-	-	-	1
Imperial Valley	1	-	-	-	-	-	-	-	-	1	-	-	2
California	119	55	111	98	66	34	22	18	40	84	98	112	857
Florida	442	465	484	423	235	10	-	-	123	296	343	357	3178
Texas	425	530	647	-	-	-	-	-	-	207	411	393	2613
Total United States	995	1052	1243	525	305	47	26	20	165	592	856	864	6690

IMPORTS

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cuba	-	-	-	-	-	-	3	210	147	-	-	-	360
Puerto Rico	3	7	9	42	74	71	59	21	70	23	13	8	400
Others	-	-	-	-	-	1	-	2	-	-	-	-	3
Total Imports	3	7	9	42	74	72	62	233	217	23	13	8	763

Table XXXIII

ORANGES AND SATSUMAS

Car-Lots Shipments in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	-	-	-	-	-	-	-	-	-	2	20	3	25
Arizona	2	-	2	7	3	-	-	-	-	-	85	57	156
California													
Northern District	23	-	-	-	2	-	-	-	-	-	3	94	122
Southern District	1981	2622	3904	3372	3713	4256	4228	3714	3676	1661	61	494	33704
Central District	484	36	28	321	221	13	13	4	-	1	2825	4125	8071
Imperial Valley	-	-	2	-	-	-	-	-	-	-	-	-	2
Florida Total	4803	3666	4211	4303	3794	1535	122	1	34	2253	3747	4373	32842
Heavy	4683	3547	4104	4207	3730	1522	122	1	30	2195	3660	4067	31868
Light	239	238	214	193	128	26	-	-	7	116	174	612	1947
Louisiana	14	8	10	2	-	-	-	-	-	2	19	19	74
Mississippi	-	-	-	-	-	-	-	-	-	10	60	5	75
Texas	403	483	373	21	-	-	-	-	-	51	288	105	1724
Totals United States	7710	6815	8530	8026	7733	5804	4363	3719	3712	3980	7128	9275	76795 #

-- Includes 200 cars for emergency relief.

Table XXXIII-Continued

ORANGES AND SATSUMAS

Truck Shipments in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
California													
Northern District	2	-	-	-	-	-	-	-	-	-	1	4	7
Southern District	51	58	115	68	58	46	34	37	42	31	16	45	601
Central District	7	-	-	-	3	-	-	-	-	-	19	64	93
California	258	249	318	257	213	158	78	98	83	68	139	296	2215
Florida	892	828	788	551	418	32	-	-	31	445	792	1687	6474
Texas	383	433	345	-	-	-	-	-	-	121	299	345	1926
Totals	1593	1568	1566	876	692	236	112	135	156	665	1266	2451	11316

IMPORTS

Canada	-	6	-	1	-	-	-	-	-	-	-	-	7
Cuba	-	1	-	-	-	-	-	1	-	-	-	-	2
Puerto Rico	-	1	2	-	-	-	-	-	1	2	1	-	7
Others	1	-	-	-	-	-	-	-	-	-	2	-	3
Total Imports	1	8	2	1	-	-	-	1	1	2	3	-	19

Table XXXIV
L E M O N S

Car-Lots Shipments in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	1	-	-	-	-	-	-	-	-	-	-	-	1
California													
Northern District	16	4	-	-	-	-	-	-	-	-	2	6	28
Southern District	836	958	1265	1279	1904	2306	1838	1191	795	507	500	790	14169
Central District	127	37	18	15	34	47	46	28	28	23	22	22	447
Texas	-	-	-	-	-	-	-	-	-	-	3	-	3
Total United States	980	999	1303	1294	1938	2353	1884	1219	823	530	527	818	14668
T R U C K S													
California	126	110	204	210	154	143	38	32	37	28	27	23	1132
I M P O R T S													
Chile	-	-	-	-	-	-	-	8	3	4	-	-	15
Italy	-	12	9	2	6	34	13	14	3	7	63	61	224
Others	-	-	1	-	-	-	-	-	-	-	-	-	1
Totals	-	12	10	2	6	34	13	22	6	11	63	61	240

Table XXXV

T A N G E R I N E S

Car-Lots Shipments in 1937

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
California														
Southern District	-	-	2	1	-	-	-	-	-	-	2	1	6	
Florida total	1173	925	137	6	-	-	-	-	-	-	216	1578	4035	
Heavy	1070	922	136	6	-	-	-	-	-	-	215	1554	4003	x
Light	6	7	1	-	-	-	-	-	-	-	2	49	65	#
Louisiana	-	-	-	-	-	-	-	-	-	-	3	3	6	
Total United States	1173	925	139	7	-	-	-	-	-	-	221	1582	4047	

T R U C K   S H I P M E N T S

California	23	8	7	4	-	-	-	-	-	-	3	48	93	**
Florida	209	245	135	7	-	-	-	-	-	-	51	352	999	
Totals	232	253	142	11	-	-	-	-	-	-	54	400	1092	

** -- Based on Los Angeles and San Francisco unloading reports.

Table XXXVI

MIXED CITRUS FRUIT

Car-Lot Shipments in 1937
(Including boat but not movement by
Motor Trucks)

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Arizona	9	-	-	2	10	-	-	-	-	-	10	6	37
California													
Southern District	98	102	170	132	144	246	325	196	113	43	5	51	1625
Central District	12	-	-	-	-	-	1	4	4	1	23	44	89
Imperial Valley	3	1	-	-	-	-	-	-	-	-	-	1	5
Florida total	1500	1118	876	749	510	143	32	21	72	562	819	1983	8385
Heavy	1378	1031	826	700	473	140	32	21	67	489	718	1826	7701 x
Light	243	174	101	98	73	7	-	-	10	145	203	313	1367
Louisiana	27	13	1	-	-	-	-	-	-	5	18	30	94
Texas	443	405	275	13	-	-	-	-	-	119	240	171	1666
Total United States	2093	1639	1322	896	664	389	358	221	189	730	1115	2286	11901

Table XXXVII

GRAPEFRUIT

(Florida)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	2740	2464	2589	2587	1176	94	3	-	69	887	1427	1619	15655
1933	2099	1990	2783	2402	2165	1248	427	205	836	1921	2129	1927	20132
1934	2224	2105	2397	2119	1033	122	1	2	744	2097	2331	1917	17092
1935	2062	1834	2511	3178	1997	862	161	5	392	1742	1834	1308	17886
1936	1764	2260	2477	2305	1179	110	-	20	1424	2085	2440	2373	18437
1937	3711	3028	2624	3418	2288	245	2	-	911	2111	1438	1601	21377
Totals	14600	13681	15381	16009	9838	2681	594	232	4376	10843	11599	10745	110599
Average													18429

Table XXXVIII

G R A P E F R U I T

(Texas)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1371	1695	1576	-	-	-	-	-	30	564	960	707	6903
1933	1062	654	101	-	-	-	-	-	206	146	290	566	3025
1934	874	438	322	39	-	-	-	-	29	254	861	843	3660
1935	1498	1341	1027	117	-	-	-	-	-	642	1269	938	6832
1936	1289	784	274	10	-	-	-	-	-	954	1595	2035	6941
1937	3128	2951	5586	239	-	-	-	-	-	1438	1797	2317	17456
Totals	9222	7863	8886	405	-	-	-	-	265	3998	6772	7406	44817

Table XXXIX

GRAPEFRUIT

(Southern California)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	54	47	71	95	236	425	134	107	81	50	75	23	1398
1933	24	40	27	108	133	105	131	92	38	24	52	46	820
1934	105	96	137	176	193	339	278	176	68	33	26	34	1661
1935	51	45	42	68	257	370	355	235	115	79	80	46	1743
1936	104	138	203	210	361	473	221	76	37	15	16	21	1875
1937	36	10	19	35	79	160	170	111	79	46	27	29	799
Totals	374	376	497	692	1259	1872	1289	797	418	247	276	199	8296
Average													1383

Table XL

GRAPEFRUIT

(Arizona)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	36	35	47	50	37	-	-	-	-	13	48	37	303
1933	57	68	67	35	32	49	1	-	-	5	30	51	395
1934	96	100	209	172	155	93	-	-	-	84	94	106	1109
1935	110	142	133	163	144	28	3	-	-	78	167	150	1138
1936	317	332	308	317	306	76	-	-	35	195	107	97	2090
1937	185	43	102	108	162	32	1	-	-	161	117	188	999
Totals	801	720	866	865	836	278	5	-	35	536	563	529	6034
Average													1006

Table XLI

GRAPEFRUIT

(Imperial Valley of California)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	17	17	16	26	44	3	-	-	-	17	15	21	176
1933	26	23	27	28	17	-	-	-	-	12	29	18	180
1934	56	40	54	57	50	2	-	-	-	7	14	15	295
1935	21	28	41	39	16	1	-	-	-	7	48	21	222
1936	54	106	118	105	86	6	-	-	-	33	37	25	570
1937	45	54	71	39	-	-	-	-	-	32	25	18	284
Totals	219	268	327	294	213	12	-	-	-	108	168	118	1727
Average													288

Table XLII

G R A P E F R U I T

Central California Combined.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	-	2	2	22	13	25	2	-	1	1	2	-	70
1933	1	2	1	30	8	-	-	-	-	-	-	4	46
1934	-	20	36	69	78	21	-	-	-	3	-	1	228
1935	1	2	30	63	12	17	6	2	-	3	2	2	140
1936	-	-	7	68	112	56	3	-	1	4	-	1	252
1937	2	4	6	-	3	2	-	-	1	4	-	-	22
Total	4	30	82	252	226	121	11	2	3	15	4	8	758
Average													129

Table XLIII

G R A P E F R U I T

Northern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932	-	1	1	-	-	-	-	-	-	-	-	-	2
1933	-	-	-	-	-	-	-	-	-	-	-	-	
1934	-	-	-	-	-	-	-	-	-	-	-	-	
1935	-	-	-	-	-	-	-	-	-	-	-	-	
1936	-	-	-	1	-	-	-	-	-	-	-	-	1
1937	-	-	-	-	-	-	-	-	-	-	-	-	
Total	-	1	1	1	-	-	-	-	-	-	-	-	3

G R A P E F R U I T

(Listed just California)

1937	119	55	111	98	66	34	22	18	40	84	98	112	857

Table XLIV

ORANGES AND SATSUMAS

Southern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	3374	4914	6374	5011	5164	4987	5907	4751	4848	4362	1398	519	51719
1933	3263	3875	4572	4623	4670	5308	5206	4616	4900	5062	3487	450	50092
1934	2558	2864	5461	4744	4248	6083	4926	5248	4459	2971	283	1184	45029
1935	4240	3196	5867	6483	5746	6004	7506	5917	5763	5276	2443	1209	61675
1936	2786	3660	4941	5839	4849	6365	6474	4836	4958	2996	271	653	48630
1937	2032	2680	4019	3440	3771	4302	4262	3751	3720	1692	97	559	34305
Totals	18253	23199	31234	30140	28448	32949	34281	29121	28713	22559	7979	4574	291450
Average													48575

Table XIV

O R A N G E S   A N D   S A T S U M A S

(Florida)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	3258	3421	2926	2467	1705	267	1	-	-	40	1452	4166	19703
1933	3943	3562	3893	3477	3657	2429	338	9	20	429	3111	5699	30567
1934	5765	4943	6219	4546	2777	260	-	-	9	1580	4928	5691	36718
1935	4039	4272	4335	3187	2246	1010	140	8	17	727	3389	3210	28580
1936	4345	4994	5427	4368	2754	512	1	-	22	2184	4526	5342	34495
1937	5695	4494	4999	4854	4212	1567	122	1	65	2698	4539	6070	39316
Totals	27045	25686	27799	22919	17351	6045	602	18	133	7658	21945	32178	189379
Average													31563

Table XLVI

O R A N G E S   A N D   S A T S U M A S

Central District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	254	112	125	1202	1044	89	10	-	-	1	3527	2381	8745
1933	133	1	-	280	766	639	30	-	-	-	504	2873	5226
1934	725	1	5	402	1751	227	1	-	-	33	3923	3379	10447
1935	1234	144	169	1403	2339	553	22	23	25	22	1623	3188	10745
1936	595	37	109	304	1555	770	21	18	13	19	3718	3636	10795
1937	491	36	28	321	224	13	13	4	-	1	2844	4189	8164
Totals	3432	331	436	3912	7679	2291	97	45	38	76	16139	19646	54122
Average													9020

Table XLVII

CRANGES AND SATSUMAS

(Texas)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	33	44	75	-	-	-	-	-	-	4	12	32	200
1933	30	79	40	-	-	-	-	-	9	30	85	205	478
1934	186	192	224	33	-	-	-	-	1	79	209	277	1201
1935	279	307	79	2	-	-	-	-	-	32	141	412	1252
1936	402	411	94	1	-	-	-	-	-	223	669	761	2561
1937	786	916	718	21	-	-	-	-	-	172	587	450	3650
Totals	1716	1949	1230	57	-	-	-	-	10	540	1703	2137	9342
Average													1557

Table XLVIII

ORANGES AND SATSUMAS

Northern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	51	6	6	-	-	1	-	-	-	-	144	243	451
1933	7	6	2	-	-	-	-	-	-	-	-	1	16
1934	-	-	-	-	-	-	-	-	-	-	57	79	136
1935	10	2	-	3	9	-	-	-	-	-	1	91	116
1936	26	1	-	-	1	-	-	-	-	-	31	116	175
1937	25	--	-	-	2	-	-	-	-	-	4	98	129
Totals	119	15	8	3	12	1	-	-	-	-	237	628	1023
Average													170

Table XLIX

O R A N G E S A N D S A T S U M A S

(Arizona)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	20	-	-	-	-	-	-	-	-	-	30	60	110
1933	16	-	-	-	-	-	-	-	-	-	2	61	79
1934	36	2	14	11	-	-	-	-	-	-	33	44	140
1935	9	13	39	4	-	-	-	-	-	-	70	92	227
1936	-	2	10	8	8	14	-	-	-	-	138	34	214
1937	2	-	2	7	3	-	-	-	-	-	85	57	156
Totals	83	17	65	30	11	14	-	-	-	-	358	348	926
Average													154

Table L

ORANGES AND SATSUMAS

(Alabama)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	-	-	-	-	-	-	12	175	41	228
1933	-	-	-	-	-	-	-	-	-	-	-	-	-
1934	-	-	-	-	-	-	-	-	-	11	97	11	119
1935	-	-	-	-	-	-	-	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	8	7	-	15
1937	-	-	-	-	-	-	-	-	-	2	20	3	25
Totals	-	-	-	-	-	-	-	-	-	33	299	55	387
Average													64

Table LI

O R A N G E S   A N D   S A T S U M A S

(Louisiana)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	26	9	2	-	1	-	-	-	-	2	43	23	106
1933	7	-	-	-	-	-	-	-	-	4	19	9	39
1934	3	1	-	1	-	-	-	-	-	7	22	16	50
1935	5	1	-	-	-	-	-	-	-	-	5	11	22
1936	1	-	-	-	-	-	-	-	-	2	7	9	19
1937	14	8	10	2	-	-	-	-	-	2	19	19	74
Totals	56	19	12	3	1	-	-	-	-	17	115	87	310
Average													51

Table LII

O R A N G E S   A N D   S A T S U M A S

(Mississippi)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	-	-	-	-	-	-	6	37	5	48
1933	-	-	-	-	-	-	-	-	-	-	1	-	1
1934	-	-	-	-	-	-	-	-	-	21	100	4	125
1935	-	-	-	-	-	-	-	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	12	31	-	43
1937	-	-	-	-	-	-	-	-	-	10	60	5	75
Totals	-	-	-	-	-	-	-	-	-	49	229	14	292
Average	-	-	-	-	-	-	-	-	-	-	-	-	48

Table LIII

ORANGES AND SATSUMAS

Imperial Valley of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	3	-	-	-	-	-	-	-	-	3
1933	-	-	-	-	-	-	-	-	-	-	-	-	0
1934	-	7	9	-	-	-	-	-	-	-	-	-	9
1935	-	12	-	-	-	-	-	-	-	-	-	-	12
1936	-	9	7	-	-	-	-	-	-	-	-	-	16
1937	-	-	2	-	-	-	-	-	-	-	-	-	2
Totals	-	28	11	3	-	-	-	-	-	-	-	-	42
Average													7

Table LIV

LEMONS

Southern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	941	977	1780	1541	2423	2354	1775	979	611	523	560	654	15118
1933	865	533	976	1014	2293	2770	1494	1291	928	999	788	751	14702
1934	905	674	1183	1217	2525	2764	2688	1506	665	940	730	935	16732
1935	1260	1413	1781	2591	3221	3191	3176	1984	734	975	658	821	21805
1936	870	1001	1476	1387	2569	2593	2596	1507	1069	867	665	614	17214
1937	836	958	1285	1279	1904	2306	1838	1191	795	507	500	790	14189
Totals	5677	5556	8481	9029	14935	15978	13567	8458	4802	4811	3901	4565	99760
Average													16626

Table LV

L E M O N S

Central District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	56	52	63	15	12	3	-	-	2	64	97	110	474
1933	30	1	3	-	-	-	-	-	-	-	37	85	156
1934	109	45	34	2	-	-	8	6	-	25	87	127	443
1935	156	79	41	11	1	-	2	-	-	5	78	190	563
1936	50	7	12	2	1	-	17	17	11	53	107	97	374
1937	127	37	18	15	34	47	46	28	28	23	22	22	447
Totals	528	221	171	45	48	50	73	51	41	170	428	631	2457
Average													409

Table LVI

L E M O N S

Northern Districts of

California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	20	20	14	5	10	9	-	-	-	-	17	15	110
1933	2	-	-	-	-	-	-	-	-	-	-	-	2
1934	-	-	-	-	-	-	-	2	-	5	9	7	23
1935	3	1	9	4	-	-	-	-	-	-	4	18	39
1936	21	1	-	-	1	-	-	1	-	-	9	12	45
1937	16	4	-	-	-	-	-	-	-	-	2	6	28
Totals	62	26	23	9	11	9	-	3	-	5	41	58	247
Average													41

Table LVII

L E M O N S

(Arizona)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	-	-	-	-	-	-	2	2	-	4
1933	-	-	-	-	-	-	-	-	-	-	-	-	0
1934	-	-	-	-	-	-	-	-	-	1	4	4	9
1935	-	-	-	-	-	-	-	-	-	-	-	-	0
1936	-	-	-	-	-	-	-	-	-	3	-	-	3
1937	1	-	-	-	-	-	-	-	-	-	-	-	1
Totals	1	-	-	-	-	-	-	-	-	6	6	4	17

Table LVIII

T A N G E R I N E S

(Florida)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	926	493	50	-	-	-	-	-	-	1	232	911	2613
1933	846	638	372	35	-	-	-	-	-	2	500	1386	3779
1934	1101	477	82	1	-	-	-	-	-	2	942	1153	3758
1935	754	353	95	-	-	-	-	-	-	3	419	1474	3098
1936	1114	432	52	2	-	-	-	-	-	4	789	1951	4344
1937	1382	1170	272	13	-	-	-	-	-	-	267	1930	5034
Totals	6123	3563	923	51	-	-	-	-	-	12	3149	8805	22626
Average													3771

Table LIX

T A N G E R I N E S

(Louisiana)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1	4	-	-	-	-	-	-	-	-	1	-	6
1933	8	-	-	-	-	-	-	-	-	-	-	-	8
1934	-	-	-	-	-	-	-	-	-	-	-	-	0
1935	1	-	-	-	-	-	-	-	-	-	-	-	1
1936	-	-	-	-	-	-	-	-	-	-	-	-	0
1937	-	-	-	-	-	-	-	-	-	-	3	3	6
Totals	10	4	-	-	-	-	-	-	-	-	4	3	21

Table IX

TANGERINES

Southern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	2	-	-	-	-	-	-	-	-	-	2
1933	-	-	-	-	-	-	-	-	-	-	-	-	0
1934	-	-	-	-	-	-	-	-	-	-	-	-	0
1935	-	-	1	-	-	-	-	-	-	-	-	-	1
1936	2	3	1	-	-	-	-	-	-	--	-	5	11
1937	-	-	2	1	-	-	-	-	-	-	2	1	6
Totals	2	3	6	1	-	-	-	-	-	-	2	6	20

Table LXI

T A N G E R I N E S

(California)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	-	-	-	-	-	-	-	-	-	0
1933	-	-	-	-	-	-	-	-	-	-	-	-	0
1934	-	-	-	-	-	-	-	-	-	-	--	-	0
1935	-	-	-	-	-	-	-	-	-	-	-	-	0
1936	-	-	-	-	-	-	-	-	-	-	-	-	0
1937	23	8	7	4	-	-	-	-	-	-	3	48	93
Totals	23	8	7	4	-	-	-	-	-	-	3	48	93
Average													15

Table LXII

M I X E D   C I T R U S   F R U I T

(Florida)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1723	1444	940	729	285	53	-	-	-	68	890	1964	8096
1933	1483	1201	1092	728	633	293	40	8	7	148	992	1975	8600
1934	1604	1272	1150	573	204	17	1	-	1	177	907	1631	7537
1935	1010	930	817	546	230	89	7	-	-	82	503	1871	6085
1936	1284	1068	883	576	242	37	-	-	4	273	1096	1738	7201
1937	1500	1118	876	749	510	143	32	21	72	562	819	1983	8385
Totals	8604	7033	5758	3901	2104	632	80	29	84	1310	5207	11162	45904
Average													7650

Table LXIII

MIXED CITRUS FRUIT

Southern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	73	92	136	115	147	337	243	183	126	93	30	33	1608
1933	123	136	190	161	181	158	202	194	131	78	54	9	1617
1934	81	121	170	169	110	302	287	232	108	50	12	46	1688
1935	151	196	229	137	97	252	444	357	177	140	62	55	2297
1936	178	255	301	366	211	443	383	197	129	84	33	46	2626
1937	98	102	170	132	144	246	325	196	113	43	5	51	1625
Totals	704	902	1196	1080	890	1738	1884	1359	784	488	196	240	10461
Average													1743

Table LXIV

MIXED CITRUS FRUIT

(Louisiana)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	23	9	-	-	-	-	-	-	-	1	20	45	98
1933	95	60	8	-	-	-	-	-	2	1	6	22	194
1934	25	13	11	-	-	-	-	-	-	7	17	34	107
1935	18	9	4	-	-	-	-	-	-	2	17	43	93
1936	24	8	1	-	-	-	-	-	-	3	22	34	92
1937	27	13	1	-	-	-	-	-	-	5	18	30	94
Totals	212	112	25	-	-	-	-	-	2	19	100	208	678
Average													113

Table IXV

M I X E D   C I T R U S   F R U I T

Central District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	14	-	4	13	5	-	2	-	-	-	31	33	102
1933	7	-	1	1	2	-	-	-	-	3	4	28	46
1934	14	-	-	2	12	1	-	-	-	-	35	23	87
1935	7	4	2	10	19	-	-	-	-	-	6	27	75
1936	5	-	1	-	3	-	-	-	-	-	48	40	97
1937	12	-	-	-	-	-	1	4	4	1	23	44	89
Totals	59	4	8	26	41	1	3	4	4	4	147	195	496
Average													82

Table **LXVI**

MIXED CITRUS FRUITS

(Arizona)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	5	-	1	-	-	-	-	-	-	-	-	-	6
1933	1	-	-	-	-	-	-	-	-	-	1	6	8
1934	5	-	2	1	-	-	1	-	-	5	2	6	22
1935	3	4	3	1	-	1	-	-	-	2	14	20	48
1936	6	3	10	6	8	2	-	-	-	8	13	11	67
1937	9	-	-	2	10	-	-	-	-	-	10	6	37
Totals	29	7	16	10	18	3	1	-	-	15	40	49	188
Average													31

Table LXVII

M I X E D   C I T R U S   F R U I T

Imperial Valley of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	--	-	-	-	-	-	-	-	-	-	0
1933	-	-	-	-	-	-	-	-	-	--	-	-	0
1934	-	-	-	-	-	-	-	-	-	-	-	-	0
1935	-	1	-	-	-	-	-	-	-	-	-	2	3
1936	-	-	1	-	-	-	-	-	-	-	1	5	7
1937	3	1	-	-	-	-	-	-	-	-	-	1	5
Totals	3	2	1	-	-	-	-	-	-	-	1	8	15

Table LXVIII

T O T A L   C I T R U S   F R U I T

Southern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	4442	6040	8363	6762	7970	8003	8059	6020	5666	5228	2063	1229	69845
1933	4275	4584	5765	5906	7277	8341	7033	6193	6057	6163	4381	1256	67231
1934	3649	3755	6951	6306	7076	9488	8179	7162	5300	3994	10512	2199	74571
1935	5702	6851	7919	9279	9321	9817	11481	8493	6794	6460	3243	2151	87511
1936	3940	5057	6922	7802	7990	9874	9674	6618	6193	3962	985	1339	70356
1937	3002	3750	5491	4888	5899	7014	6595	5249	4707	2288	631	1410	50924
Totals	25010	30037	41411	40943	45533	52537	51021	39735	34717	28095	21815	9584	420438
Average													70073

Table LXIX

T O T A L   C I T R U S   F R U I T

(Florida)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	8647	7822	6505	5783	3166	414	4	-	69	996	4001	8660	46067
1933	8371	7391	8140	6642	6455	3970	805	222	883	2500	6732	10987	64078
1934	10694	8797	9848	7239	4014	399	2	2	734	3856	9108	10392	65105
1935	7865	7389	7758	6911	4473	1961	308	13	409	2554	6145	9863	55649
1936	8507	8755	8839	7291	4175	659	1	-	1450	4546	8851	11404	64478
1937	12288	9810	8771	9034	7010	1955	156	22	1048	5371	7063	11584	74112
Totals	56372	49964	49861	42900	29293	9358	1276	259	4593	19823	41900	62890	368489
Average													61415

Table LXX

TOTAL CITRUS FRUIT

Central District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	324	166	194	1252	1074	117	14	-	3	66	3657	2524	9391
1933	171	4	5	311	776	639	30	-	-	-	544	2966	5446
1934	848	66	75	475	1851	249	9	6	-	61	4045	3520	11205
1935	1398	229	242	1487	2371	570	30	25	25	30	1709	3407	11523
1936	650	44	129	374	1671	826	41	35	25	76	3873	3774	11518
1937	632	77	52	336	261	62	60	36	33	29	2889	4255	8722
Totals	4023	586	697	4235	8004	2463	184	102	86	262	16517	20446	57805
Average													7634

Table LXXI

T O T A L   C I T R U S   F R U I T

(Texas)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1404	1739	1651	-	-	-	-	-	30	568	972	739	7103
1933	1092	733	141	-	-	-	-	-	215	176	375	771	3503
1934	1060	630	546	72	-	-	-	-	30	333	1070	1120	4861
1935	1777	1648	1106	119	-	-	-	-	-	674	1410	1350	8084
1936	1691	1195	368	11	-	-	-	-	-	1177	2264	2796	9502
1937	3974	3867	6304	260	-	-	-	-	-	1610	2384	2767	21166
Totals	10998	9812	10116	462	-	-	-	-	275	4538	8475	9543	54219
Average													9036

Table LXXII

TOTAL CITRUS FRUIT

Imperial Valley
California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	17	17	16	29	44	3	-	-	-	17	15	21	179
1933	26	23	27	28	17	-	-	-	-	12	29	18	180
1934	56	47	56	57	50	2	-	-	-	7	14	15	304
1935	21	41	41	39	16	1	-	-	-	7	48	23	237
1936	54	115	126	105	86	6	-	-	-	33	38	30	593
1937	48	57	71	39	-	-	-	-	-	32	25	19	291
Totals	222	300	337	297	213	12	-	-	-	108	169	126	1784
Average													297

Table LXXIII

T O T A L   C I T R U S   F R U I T

Northern District of California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	71	27	21	5	10	10	-	-	-	-	161	258	563
1933	9	6	2	-	-	-	-	-	-	-	-	1	18
1934	-	-	-	-	-	-	-	2	-	5	66	86	159
1935	13	3	9	7	9	-	-	-	-	-	5	109	155
1936	47	2	-	1	2	-	-	1	-	-	40	128	221
1937	41	4	-	-	2	-	-	-	-	-	6	104	157
Totals	181	42	32	13	23	10	-	3	-	5	278	686	1273
Average													212

Table LXXIV

TOTAL CITRUS FRUIT

Alabama
Oranges only - see table
(p.214)

TOTAL CITRUS FRUIT

(Arizona)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	61	35	48	50	37	-	-	-	-	15	80	97	423
1933	74	68	67	35	32	49	1	-	-	5	33	118	482
1934	137	102	225	184	155	93	1	-	-	90	133	160	1280
1935	122	159	175	188	144	29	3	-	-	80	251	262	1413
1936	323	337	328	331	322	92	-	-	35	203	261	141	2373
1937	197	43	104	117	175	32	1	-	-	161	212	151	1193
Totals	914	744	947	905	865	295	6	-	35	554	970	929	7164
Average													1194

Table LXXV

TOTAL CITRUS FRUIT

(Louisiana)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	50	22	2	1	-	-	-	-	-	3	64	68	210
1933	110	60	8	-	-	-	-	-	2	5	25	31	241
1934	28	14	11	1	-	-	-	-	-	14	39	50	157
1935	24	10	4	-	-	-	-	-	-	2	22	54	116
1936	25	8	1	-	-	-	-	-	-	5	29	43	111
1937	41	21	11	2	-	-	-	-	-	7	40	52	174
Totals	278	135	37	4	-	-	-	-	2	36	219	298	1009
Average													168

Table LXXVI

TOTAL CITRUS FRUIT

California

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	-	-	-	-	-	-	-	-	-	-	-	-	0
1933	-	-	-	-	-	-	-	-	-	-	-	-	0
1934	-	-	-	-	-	-	-	-	-	-	-	-	0
1935	-	-	-	-	-	-	-	-	-	-	-	-	0
1936	-	-	-	-	-	-	-	-	-	-	-	-	0
1937	142	63	118	102	66	34	22	18	40	84	101	160	950
Totals	142	63	118	102	66	34	22	18	40	84	101	160	950

Table LXXVII

GRAPEFRUIT TOTALS

(Without Imports)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	4218	4261	4302	2780	1506	547	139	107	181	1532	2527	2407	24507
1933	3269	2777	3006	2603	2355	1402	559	297	1080	2108	2530	2612	24598
1934	3355	2799	3155	2632	1509	577	279	178	841	2478	3326	2916	24045
1935	3743	3392	3784	3648	2426	1278	525	242	507	2551	3400	2465	27961
1936	3528	3627	3446	3065	1989	668	221	96	1494	3285	4195	4552	30166
1937	7226	6145	8517	3937	2598	473	195	129	1031	3876	3502	4165	41794
Totals	25339	23001	26100	18665	12383	4945	1918	1049	5134	15830	19480	19117	173431
Averages	4223.5	3833.5	4368.3	3110.8	2063.8	824.2	319.7	174.8	855.6	2638.3	3246.7	3186.2	28905.2

Table LXXVIII

TOTAL ORANGE SHIPMENTS

United States - Without Imports

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	7016	8516	9312	8683	7914	5244	5918	4751	4848	4627	6818	7470	81317
1933	7399	7523	8507	8380	9093	8376	5574	4625	4939	5525	7212	9298	86501
1934	9273	8010	11925	9737	8776	6570	4927	5248	4469	4702	9652	10685	93974
1935	9816	9947	10489	11082	10340	7567	7668	5948	5810	6057	7672	10535	102629
1936	8155	9114	10588	10540	9167	7661	6496	4856	4993	5444	9398	10551	96963
1937	9303	8383	10096	8902	8425	6040	4475	3854	3868	4646	8394	11726	88111
Totals	50962	51493	61117	57324	53815	41458	35058	29282	29977	31000	49146	59963	549495
Averages	8493.7	8582.2	10186.2	9554.	8969.6	6909.7	5843	4880.3	4996.2	5166.7	8191	9993.8	91582.5

Table LXXIX

T O T A L   L E M O N   S H I P M E N T S

The United States - Without Imports

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1017	1049	1857	1561	2445	2366	1775	979	613	589	676	779	15706
1933	897	534	979	1014	2293	2770	1494	1291	928	999	825	836	14860
1934	1014	719	1217	1219	2525	2764	2696	1514	665	971	850	1073	17207
1935	1419	1493	1831	2606	3222	3191	3178	1984	734	980	740	1029	22407
1936	941	1009	1488	1389	2571	2593	2613	1525	1080	920	784	723	17636
1937	1106	1109	1507	1504	2092	2496	1922	1251	860	558	554	841	15800
Totals	6594	5913	8879	9293	15148	16180	13678	8544	4880	5017	4409	5281	103616
Average													17269

Table LXXX

TOTAL TANGERINE SHIPMENTS

United States - Without Imports

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	927	497	52	-	-	-	-	-	-	1	233	911	2621
1933	854	638	372	35	-	-	-	-	-	2	500	1386	3787
1934	1101	477	82	1	-	-	-	-	-	2	942	1154	3759
1935	755	353	96	-	-	-	-	-	-	3	419	1474	3100
1936	1116	435	53	2	-	-	-	-	-	4	789	1956	4355
1937	1405	1178	281	18	-	-	-	-	-	-	275	1982	5139
Totals	6158	3578	936	56	-	-	-	-	-	12	3158	8862	22761
Average	1026.3	596.3	156	9.3						2	526.3	1477.2	3793.7

Table LXXXI

T O T A L   M I X E D   C I T R U S   F R U I T   S H I P M E N T S

United States - Without Imports

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	1923	1664	1228	857	407	390	245	193	126	170	1006	2144	10373
1933	1742	1400	1292	890	516	431	242	202	140	231	1075	2085	10534
1934	1766	1437	1355	745	326	320	269	232	109	243	1007	1764	9593
1935	1248	1211	1059	694	346	342	451	357	177	238	646	2126	9095
1936	1723	1425	1200	946	464	482	393	197	135	490	1585	2110	11193
1937	2093	1639	1532	896	664	389	358	221	189	730	1115	2286	11302
Totals	10500	8774	7455	5030	3053	2374	1968	1392	874	2102	6432	12483	62487
Average	1750	1462.7	1242.7	838.3	508.8	395.7	328	232	145.7	350.3	1072	2047.2	10415.3

Table LXXXII

T O T A L C I T R U S F R U I T S H I P M E N T S

United States - Without Imports

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
1932	15101	15987	16951	13891	12302	8547	8077	6020	5768	6919	11260	13711	134524
1933	14601	12872	14156	12922	14557	12999	7869	6415	7167	8865	12142	16185	140720
1934	16509	13442	17734	14334	13136	10251	8191	7172	6084	8396	15757	17592	148578
1935	16981	16296	17259	13030	16334	12378	11822	8551	7228	9629	12877	17527	164992
1936	15518	15610	16775	15944	14191	11404	9713	6674	7700	10143	16749	19892	160513
1937	21133	19454	21723	15257	13779	9398	6950	5455	5948	9809	13540	21000	162746
Totals	99843	92761	104598	90668	84299	64957	52622	40267	39865	53961	82625	105707	911873
Average	16640.5	15460	17433	15061.3	14049.8	10826.2	8770.3	6711.2	6644.2	8993.5	13770.8	17617.8	151978.8

Table LXXX III

ESTIMATED BEARING ACREAGE & PERCENTAGE DISTRIBUTION
by Age Groups as of July 1937 1/

State	Bearing acres 5 years & over	Bearing trees 5 years & over 1000	5-15 yrs. Not in full production.	16 yrs. & over. In full production.
	acres	trees	%	%
GRAPEFRUIT				
Early Varieties				
Florida 2/	53,676	3,489	27	73
Texas 3/	8,742	577	92	8
California 4/	1,235	101	68	32
Arizona	130	12	28	72
Total 4 States	63,783	4,179	37	63
Late Varieties (seedless)				
Florida 2/	29,492	1,917	61	39
Texas 3/	65,697	4,336	96	4
California 4/	15,618	1,281	71	29
Arizona	12,521	1,064	95	5
Total 4 States	123,328	8,598	85	15
All Varieties				
Florida 2/	83,168	5,406	39	61
Texas 3/	74,439	4,913	96	4
California 4/	16,853	1,382	71	29
Arizona	12,651	1,076	95	5
Total 4 States	187,111	12,777	69	31

Table LXXX III-Continued

ESTIMATED BEARING ACREAGE & PERCENTAGE DISTRIBUTION
by Age Groups as of July 1937 (CONT'D)

State	Bearing acres 5 years & over		Bearing trees 5 years & over 1000	5-15 yrs. Not in full production.	16 yrs. & over. In full production
	acres		trees	%	%
ORANGES					
Navel & Other Early Varieties					
Florida 2/	111,368		7,239	45	55
California 4/	88,493		7,788	26	74
Texas 3/	13,318		379	95	5
Arizona	3,636		321	80	20
Total 4 States	216,815		16,227	39	61
Valencia & Other Late Varieties					
Florida 2/	90,708		5,896	56	44
California 3/	132,749		11,683	45	55
Texas 3/	9,152		604	95	5
Arizona	2,610		228	97	3
Total 4 States	235,219		18,411	51	49
All Varieties					
Florida 2/	202,076		13,135	50	50
California 4/	221,242		19,471	37	63
Texas 3/	22,470		1,483	95	5
Arizona	6,246		549	87	13
Total 4 States	452,034	5/	34,638	45	55

Table LXXXIII-Continued

ESTIMATED BEARING ACREAGE & PERCENTAGE DISTRIBUTION
BY AGE GROUPS AS OF JULY 1937 (CONT'D)

State	Bearing acres 5 years & over	Bearing trees 5 years & over 1000	5-15 yrs. Not in full production.	16 yrs. & over. In full production.
	acres	trees	%	%
TANGERINES				
Florida 2/	24,509	1,593	62	38
California 4/	1,602	141	60	40
Texas 3/	606	40	95	5
Arizona	54	5	98	2
Total 4 States ...	26,771	1,779	63	37
LEMONS				
California 4/	47,139	4,148	34	66

1/ Estimates based upon surveys by age and varietal groups made in Florida in 1934; Arizona in 1935; California in 1936; Texas in 1934 and 1937. (Orange estimates do not include tangerines).

2/ Florida acres calculated from trees at the rate of 65 trees per acre for grapefruit, oranges and tangerines.

3/ Texas acres calculated from trees at the rate of 66 trees per acre for grapefruit, oranges and tangerines.

4/ California trees calculated from trees at the rate of 88 trees per acre for grapefruit and 88 trees peracre for oranges, tangerines and lemons.

Table LXXIII-Continued

ESTIMATED BEARING ACREAGE OF CITRUS [illegible] DISTRIBUTION[*]
BY AGE GROUPS AS OF JAN. 1937 (CONT'D)

5/ Total bearing trees in the United States amount to about 35,500,000 trees. In addition to the total for the four States shown, the census of 1935 enumerated [illegible],000 bearing trees in Alabama, Mississippi, and Louisiana. Most of the trees in Alabama and Mississippi consist of satsumas; those in Louisiana are mostly navels.

[*]From "MARKETING FLORIDA CITRUS SUMMARY OF 1937-38 SEASON" by [illegible] Willson published at Lakeland, Florida. Sept. 3rd, 1938

Table LXXXIV

WEEKLY AUCTION [illegible] AND [illegible] PRICES

ORANGES

Week Ending		Florida Oranges Carlots	Florida Oranges Prices	California Oranges Carlots	California Oranges Prices
September	24			23	$5.18
October	1			28	5.33
October	8			24	5.04
October	15	2	$4.45	25	5.40
October	22	15	3.45	25	5.09
October	29	10	3.31	24	4.49
November	5	22	3.09	22	3.83
November	12	25	2.63	15	4.24
November	19	18	2.78	8	4.77
November	26	21	2.67	12	3.96
December	3	13	2.33	40	2.88
December	10	10	2.41	39	2.75
December	17	18	2.25	37	2.61
December	24	10	2.08	46	2.41

Table LXXXIV-Continued

WEEKLY AUCTION SALES AT DETROIT MICHIGAN

ORANGES

Week ending	Florida Oranges Carlots	Florida Oranges Prices	California Oranges Carlots	California Oranges Prices
December 31	3	$2.15	22	$2.28
January 7	12	2.23	23	2.15
January 14	16	1.99	20	2.39
January 21	12	1.98	20	2.34
January 28	7	1.96	20	2.51
February 4	4	2.26	19	2.47
February 11	17	2.23	23	2.73
February 18	20	1.98	24	2.78
February 25	12	1.91	24	2.37
March 4	12	2.00	29	2.72
March 11	16	2.02	23	2.66
March 18	19	1.93	34	2.45
March 25	16	1.96	33	2.40
April 1	13	1.82	38	2.28
April 8	11	2.11	34	2.34

Table LXXXIV-Continued

WEEKLY AUCTION SALES AT DETROIT MICHIGAN

ORANGES

Week Ending	Florida Oranges Carlots	Florida Oranges Prices	California Oranges Carlots	California Oranges Prices
April 15	20	$2.12	31	$2.70
April 22	23	1.84	29	2.57
April 29	18	1.68	31	2.73
May 6	16	1.95	32	2.82
May 13	16	2.38	34	2.85
May 20	26	2.00	38	2.77
May 27	10	1.93	45	2.64
June 3	10	2.19	33	2.47
June 10	12	2.49	43	2.68
June 17	11	2.04	37	2.52
June 24	6	2.47	37	2.64
July 1	7	2.22	35	2.76
July 8	2	2.54	29	2.89
July 15			31	3.13
July 22			33	3.25
TOTALS	331	2.25	1275	3.00

TABLE LXXXIV (CON'T)

WEEKLY AUCTION SALES AT DETROIT MICHIGAN

GRAPEFRUIT (CONT'D)

Week Ending		Texas Carlots	Texas Prices	Week Ending		Florida Carlots	Florida Prices
April	15	4	$ 2.09	April	15	12	$ 2.64
April	22	8	2.02	April	22	19	2.28
April	29	14	1.86	April	29	5	2.51
May	6	16	1.72	May	6	5	2.51
May	13	5	2.64	May	13	4	2.13
May	20	15	2.22	May	20	3	2.26
May	27	17	2.00				
June	3	12	1.73				
June	10	2	2.44				
June	17	10	1.75				
June	24	4	1.31				
July	1	1	.75				
SEASON TOTALS		214	$2.20			511	$2.23

TABLE LXXXIV

WEEKLY AUCTION SALES AT DETROIT MICHIGAN

GRAPEFRUIT

Week Ending	Texas Carlots	Texas Prices	Week Ending	Florida Carlots	Florida Prices
			September 17	7	$ 3.38
			September 24	4	3.39
			October 1	19	2.71
			October 8	11	2.78
			October 15	11	2.70
October 22	9	$3.17	October 22	3	3.24
October 29	23	2.50	October 29	11	2.23
November 5	10	2.18	November 5	6	1.95
November 12	15	2.26	November 12	3	1.84
November 19	9	2.42	November 19	-	-
November 26	14	2.60	November 26	3	2.26
December 3	18	2.32	December 3	-	-
December 10	19	2.35	December 10	1	2.47
December 17	21	2.22	December 17	2	1.91
December 24	17	2.28	December 24	-	-
December 31	8	2.29	December 31	-	-

TABLE LXXIV (CONT'T)

WEEKLY AUCTION SALES AT DETROIT MICHIGAN

GRAPEFRUIT

Week Ending	Texas Carlots	Prices	Week Ending	Florida Carlots	Prices
January 7	1	$ 1.62	January 7	21	$ 2.14
January 14	3	2.02	January 14	20	2.19
January 21	1	2.00	January 21	23	2.09
January 28	1	1.25	January 28	25	1.93
February 4	-	-	February 4	18	1.96
February 11	1	1.72	February 11	22	1.99
February 18	1	1.91	February 18	23	1.97
February 25	1	1.71	February 25	20	2.08
March 4	-	-	March 4	13	2.41
March 11	3	2.18	March 11	23	2.27
March 18	5	1.92	March 18	23	2.29
March 25	3	2.03	March 25	25	2.09
April 1	2	1.68	April 1	23	2.08
April 8	3	2.16	April 8	15	2.40
April 15	4	2.09	April 15	13	2.64

MONTHLY PRICES--ALL AUCTIONS

	Table LXXXVI				Table LXXXVII				Table LXXXVIII	
MONTH	FLORIDA ORANGES (Combined grades)		CALIFORNIA ORANGES		FLORIDA GRAPEFRUIT		TEXAS GRAPEFRUIT		TANGERINES 4/5 Bu. Boxes	
	36-7	37-8	36-7	37-8	36-7	37-8	36-7	37-8	36-7	37-8
SEPTEMBER	-	$3.18	-	-	$2.28	$2.32	-	-	-	-
OCTOBER	$3.08	3.45	$4.24	$4.97	2.20	2.55	$2.01	$2.56	$1.00	-
NOVEMBER	2.84	2.66	4.04	3.86	1.92	2.04	2.24	2.21	1.07	$1.27
DECEMBER	2.83	1.82	2.83	2.58	1.98	2.29	2.07	2.08	1.09	1.[illegible]
JANUARY	2.89	2.14	3.00	2.87	1.96	2.07	2.00	1.94	.94	1.01
FEBRUARY	3.41	2.00	4.04	2.75	1.92	2.00	1.96	1.91	1.10	1.10
MARCH	3.74	1.94	3.95	2.49	2.14	2.08	2.07	2.06	1.01	1.13
APRIL	3.62	1.94	4.15	3.00	2.81	2.01	2.44	[illegible].?7	1.13	1.[illegible]
MAY	3.42	2.19	4.27	2.81	2.15	2.06	-	2.15	-	-
JUNE	3.84	[illegible]	4.33	2.68	3.18	1.65	-	-	-	-
JULY	4.27	2.26	-	-	3.17	1.37	-	-	-	-
SEASON TOTALS	3.21	2.34	4.01	2.99	2.23	2.16	2.10	2.08	1.10	1.14

Table LXXXIX

C A R - L O T   U N L O A D S

Average for six year period - 1932 - 1937

(New England States)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Boston, Mass	1208.00	692.67	5774.00	184.50	7859.17
Bridgeport, Conn.	55.16	27.33	233.00	11.16	326.65
Hartford, Conn.	168.33	53.67	644.33	32.83	899.16
New Haven, Conn.	85.	11.00	335.17	13.33	444.50
Portland, Me.	52.33	16.67	287.33	.17	356.50
Providence, R. I.	123.67	47.33	624.5	52.83	828.33
Springfield, Mass.	99.33	24.33	443.00	7.83	574.50
Worcester, Mass.	6.67	0	31.83	.33	38.83
Total Averages	1798.50	873.00	8373.1	282.98	11,327.64

Table XC

C A R - L O T U N L O A D S

Average for six year period - 1932 - 1937

(Middle Atlantic States)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Albany, New York	75.	72.17	473.16	3.5	623.83
Baltimore, Maryland	445.5	516.83	1494.5	133.5	2590.33
Buffalo, New York	352.16	178.33	1057.16	47.67	1635.33
Newark, New Jersey	83.83	3.00	299.17	.5	386.50
New York, New York	6217.33	2839.83	17592.00	1310.5	27959.67
Norfolk, Virginia	33.67	32.	149.33	1.5	211.50
Philadelphia, Pennsylvania	1510.67	919.00	5619.17	405.67	8454.50
Pittsburg, Pennsylvania	604.67	482.67	1980.33	166.17	3233.83
Richmond, Virginia	72.83	77.17	265.67	9.33	425.00
Rochester, New York	153.17	86.00	594.33	54.33	887.83
Syracuse, New York	131.17	60.00	422.67	8.00	621.83
Washington, D. C.	216.67	25.50	659.33	13.	914.50
Total Average	9876.67	5287.50	30908.33	2005.67	48076.67

Table XCI

C A R - L O T U N L O A D S

Average for six year period - [illegible] - [illegible]

(Central States - Eastern Group)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Akron, O.	17.83	[illegible].17	[illegible].67	.83	74.[illegible]
Chicago, Ill.	1922.67	1207.50	[illegible].17	[illegible].67	[illegible].00
Cincinnati, O.	559.00	4[illegible]1.17	[illegible].17	100	[illegible].33
Cleveland, O.	[illegible]1.00	409.00	1004.83	1[illegible].17	[illegible].00
Columbus, O.	194.50	[illegible].17	[illegible].33	11.[illegible]	[illegible]
Dayton, O.	[illegible]	[illegible]	[illegible]	1.	[illegible].17
Detroit, Mich.	86[illegible].17	5[illegible].33	[illegible].67	[illegible].5	41[illegible].17
Evansville, Ind.	[illegible].17	[illegible]	[illegible].5	4.17	[illegible].67
Grand Rapids, Mich.	[illegible].33	[illegible].5	[illegible].00	[illegible]	[illegible].33
Indianapolis, Ind.	[illegible].	109.83	[illegible].67	[illegible].33	[illegible].00
Lexington, Ky.	[illegible]9.33	[illegible].33	72.33	1.[illegible]	[illegible]
Louisville, Ky.	1[illegible].00	7[illegible].	[illegible]5.17	16.67	[illegible].64
Milwaukee, Wisc.	[illegible]	1[illegible].00	[illegible].67	21.67	1844.83
Peoria, Ill.	72.33	[illegible].33	[illegible]9.17	8.5	[illegible]

([illegible])

Table XCI-Continued

(Central States - Eastern Group - Continued)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Terre Haute, Ind.	13.33	4.17	41.17	0	58.67
Toledo, O.	110.17	52.	357.5	7.17	526.83
Youngstown, O.	64.5	27.	232.83	4.33	328.67
Total average	5337.16	3210.33	16065.18	694.67	25307.34

Table XCII

C A R - L O T U N L O A D S

Average for six year period - 1932 - 1937

(Central States - Western Group)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Des Moines, Iowa	134.50	63.50	316.00	2.17	516.17
Duluth, Minn.	59.67	28.50	217.50	.33	306.00
Kansas City, Kan.	415.33	220.83	769.00	25.33	1430.50
Minneapolis, Minn.	360.17	193.00	807.17	24.17	1384.50
Omaha, Neb.	170.67	100.17	415.17	7.00	693.00
Sioux City, Iowa	89.50	53.33	203.17	1.83	347.83
St. Louis, Mo.	583.67	462.17	1630.00	54.33	2730.17
St. Paul, Minn.	149.17	68.50	416.33	7.33	641.33
Total Averages	1962.67	1190.00	4774.33	122.50	8049.50
			(Southwestern States)		
Denver, Colo.	270.83	158.00	596.00	2.83	1027.67
Los Angeles, Cal.	51.67	2.17	21.33	0	75.17
Salt Lake City, Utah	49.67	39.17	264.17	0	353.00
San Francisco, Cal.	341.33	151.00	791.17	3.5	1287.00
Total Averages	713.50	350.33	1672.67	6.33	2742.83

Table XCIII

C A R - L O T   U N L O A D S

Average for six year period - 1932 - 1937

(Southern States - Eastern Section)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Atlanta, Ga.	53.50	202.50	254.33	4.67	515.00
Birmingham, Ala.	39.67	121.17	316.17	1.13	443.17
Jacksonville, Fla.	45.50	93.00	18.83	0	157.33
Memphis, Tenn.	128.83	146.67	474.83	6.50	756.83
Nashville, Tenn.	89.67	77.67	326.50	4.83	498.67
Tampa, Fla.	1.50	48.00	3.50	0	53.00
Total Averages	358.67	694.00	1381.16	17.16	2400.00

(Southern States - Western Section)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Dallas, Tex.	126.00	168.67	409.17	.50	704.33
El Paso, Tex.	31.	72.	245.17	0	348.17
Fort Worth, Tex.	59.17	72.33	148.33	0	279.83
Houston, Tex	65.	174.17	346.83	0	586.00
New Orleans, La.	181.00	328.83	673.33	18.50	1201.67
Oklahoma City, Okla.	86.17	90.5	271.00	.67	448.33

(Concluded on next page)

Table XCIII-Continued

(Southern States - Western Section - Continued)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
San Antonio, Tex	19.83	112.00	217.17	0	349.00
Shreveport, La.	15.67	38.5	94.17	.67	149.00
Total Averages	583.84	1057.00	2402.17	20.34	4063.33

(Northwestern States)

	GRAPEFRUIT	LEMONS	ORANGES	TANGERINES	TOTAL CITRUS
Portland, Ore.	231.00	130.00	709.50	2.00	1072.50
Seattle, Wash.	284.83	162.00	860.00	70.17	1377.00
Spokane, Wash.	46.33	23.67	152.00	.17	222.17
Total Averages	562.17	315.67	1721.50	72.33	2671.67

Table XCIV

F L O R I D A   V A L E N C I A   O R A N G E S

Weight to the Nearest .1 Gram

Size:	96	100	126	150	176	200	216	252	288	324
Sample No.										
1.	480.2	503.6	315.5	269.0	201.4	176.4	164.3	161.4	116.7	144.6
2.	392.0	518.3	302.7	257.2	206.0	180.2	181.8	160.0	123.2	146.3
3.	391.6	418.0	320.4	277.0	201.3	167.9	206.2	167.7	111.6	122.7
4.	406.5	437.2	332.7	257.5	184.5	186.7	200.6	162.8	141.0	127.6
5.	463.8	411.0	305.9	260.5	190.1	165.0	201.8	161.3	142.5	125.4
6.	404.8	435.1	314.9	233.9	183.4	178.5	182.0	170.2	131.3	148.7
7.	405.5	399.9	320.6	234.6	190.4	187.0	203.1	146.2	130.7	107.3
8.	388.7	423.9	300.1	253.7	196.8	192.9	187.0	162.7	128.0	119.3
9.	477.7	426.7	300.2	249.0	181.5	175.6	196.2	139.2	120.2	128.0
10.	409.9	427.8	276.3	250.1	190.0	176.4	181.7	145.2	130.0	125.0
11.	481.0	362.4	284.7	240.5	198.8	184.8	163.7	128.2	130.1	102.7
12.	481.9	343.4	291.9	256.5	185.4	198.7	183.6	141.6	122.4	109.5
Totals	5183.6	5105.3	3665.9	3019.5	2613.4	2167.1	2240.0	1846.5	1527.7	1515.1
Average	431.966	425.44	305.491	251.625	192.466	180.59	186.666	153.875	127.308	126.258

Table XCV

C A L I F O R N I A   N A V E L   O R A N G E S

Weight to the nearest .1 gram

Size:	100	126	150	176	200	220	252	288	344
Sample Number:									
1.	340.7	242.6	183.5	194.9	152.7	143.4	122.5	100.6	103.4
2.	281.0	245.7	219.7	195.4	158.7	144.1	144.9	99.3	90.5
3.	328.5	265.1	206.6	208.5	169.3	146.1	126.1	113.7	96.2
4.	322.0	275.7	208.5	184.9	176.4	133.7	106.9	106.2	99.4
5.	324.4	293.2	209.0	181.8	168.6	139.7	108.1	110.5	98.8
6.	299.8	270.3	180.6	189.2	150.2	150.0	107.0	101.0	96.6
7.	300.0	232.2	189.5	200.0	186.8	157.5	125.2	113.4	96.0
8.	281.0	225.5	194.5	135.9	170.3	140.9	111.6	104.2	93.4
9.	289.3	219.3	169.3	212.2	179.0	133.7	117.4	89.0	88.1
10.	268.0	229.5	180.3	161.3	189.5	143.5	119.8	89.0	86.4
11.	285.5	232.2	194.3	178.1	165.2	148.5	120.9	97.4	95.6
12.	315.5	208.4	175.0	174.4	176.0	136.9	112.0	92.0	78.4
Totals	3605.8	2944.7	2310.8	2266.6	2042.7	1718.0	1422.4	1216.3	1122.8
Average	300.48	245.39	192.56	188.883	170.22	143.16	118.533	101.33	93.5666

Table XCVI

F L O R I D A   T E M P L E   O R A N G E S

Weight to the nearest .1 gram

Size:	126	150	176
Sample No.			
1.	312.3	244.5	212.7
2.	340.0	244.8	204.0
3.	350.0	228.0	214.3
4.	302.9	240.7	215.8
5.	255.6	240.2	206.5
6.	277.8	241.3	205.9
7.	275.8	225.0	215.1
8.	284.3	255.6	204.6
9.	270.0	241.9	214.3
10.	280.5	240.9	206.3
11.	281.1	241.5	212.7
12.	280.8	263.7	195.2
Totals	3511.1	2908.1	2497.4
Average	312.59	242.34	208.116

Table XCVII

FLORIDA PINEAPPLE — Weight to the nearest .1 gram				"FLORIDA ROUND BULK"		FLORIDA VALENCIA EXPRESS BULK	
Size:	150	176	200		Grams:		Grams:
Sample No.				Sample No.		Sample No.	
1.	238.4	258.5	183.3	1.	183.2	1.	227.4
2.	265.2	209.1	212.2	2.	170.3	2.	201.0
3.	277.0	204.0	191.1	3.	184.5	3.	137.9
4.	248.1	204.8	211.0	4.	169.8	4.	103.4
5.	232.6	215.4	200.3	5.	176.3	5.	92.3
6.	270.8	227.5	192.2	6.	167.0	6.	94.6
7.	256.9	244.1	200.2	7.	171.5	Totals	900.6
8.	276.0	208.1	185.0	8.	154.4	Average	150.1
9.	266.0	220.7	196.8	9.	175.0		
10.	246.4	213.3	194.4	10.	160.3		
11.	254.7	215.9	199.8	11.	176.3		
12.	256.0	194.2	202.9	12.	162.8		
Totals	3068.10	2613.4	2368.2	Totals	2041.4		
Average	255.675	217.78	197.35	Average	170.6		

Table XCVIII

F L O R I D A   V A L E N C I A   B U L K

Weight to the nearest .1 gram

Size:	U. S. #1	U. S. #2	U. S. #3
Sample No.			
1.	310.9	356.0	345.0
2.	283.5	326.5	327.5
3.	219.1	232.4	332.1
4.	232.9	283.0	259.4
5.	234.7	328.0	317.0
6.	207.7	243.0	266.0
7.	228.6	233.0	282.8
8.	208.1	191.5	312.5
9.	229.2	195.3	242.2
10.	220.4	153.2	290.4
11.	244.8	173.1	335.0
12.	148.0	138.4	333.7
Totals	2767.9	2853.4	3641.6
Average	230.658	237.78	303.466

T E X A S   N A V E L   O R A N G E S

Weight to the nearest .1 gram

Size:	(Not graded)
Sample No.	
1.	219.5
2.	219.7
3.	206.7
4.	242.9
5.	207.0
6.	202.1
7.	224.0
8.	227.7
9.	215.1
10.	199.0
11.	215.0
12.	209.9
Totals	2618.6
Average	218.216

Table XCIX

W E I G H T S O F O R A N G E S

(In Grams)

FLORIDA VALENCIAS

Size	Lightest	Heaviest	Average
96	388.7	481.9	431.97
100	399.9	518.3	425.44
126	276.3	332.7	305.49
150	233.9	277.0	251.62
176	181.5	206.0	192.47
200	165.0	198.7	180.59
216	163.6	206.2	186.67
250	128.2	167.7	153.87
288	111.6	142.5	127.31
324	102.7	148.7	126.26

FLORIDA PINEAPPLE

Size	Lightest	Heaviest	Average
150	232.6	277.0	255.67
176	194.2	258.5	217.78
200.	183.3	211.0	197.35

CALIFORNIA NAVELS

Size	Lightest	Heaviest	Average
-	-	-	-
100	268.0	340.7	308.48
126	208.4	293.2	245.89
150	169.3	219.7	192.56
176	174.4	212.2	188.83
200	150.2	189.5	170.22
220	133.7	157.5	143.16
252	106.9	144.9	118.53
288	89.0	113.7	101.33
344	78.4	103.4	93.56

FLORIDA TEMPLE

Size	Lightest	Heaviest	Average
	255.6	350.0	312.59
	228.0	263.7	242.34
	195.2	215.8	208.12

Table C

WEIGHTS AND VOLUMES OF JUICES

Florida Valencia Oranges

Size:	Weight per dozen	Unstrained Juice: Weight in grams	Unstrained Juice: Volume in milliliters	Strained Juice: Weight in grams	Strained Juice: Volume in milliliters
96	5183.6	2929.7	2861.	2560.0	2441
100	5105.3	2616.9	2679	2561.2	2496
126*	3665.9	2206.0	2156	2002.4	1940
150	3019.5	1940.4	2168	1797.9	1732
176	2309.6	1314.6	1324	1271.9	1230
200	2167.1	1291.8	1268	1205.2	1162
216	2240.0	1459.8	1410	1337.1	1282
250	1846.5	1260.0	1116	1056.7	1015
288	1527.7	945.3	906	855.5	820
324	1515.1	853.0	823.0	794.0	760

* -- One spoiled - totals corrected to make 12

Table CI

W E I G H T S   A N D   V O L U M E S   O F   J U I C E

California Navel Oranges

Size:	Weight per dozen	Unstrained Juice: Weight in grams	Unstrained Juice: Volume in milliliters	Strained Juice: Weight in grams	Strained Juice: Volume in milliliters
100	3605.8	1808.9	1998.9	1418	1292
126	2944.7	1394.8	1350	1238.3	1212
150	2310.8	1160.5	1150.0	1050.2	1014
176	2266.6	1086.9	1056.0	944.0	903
200	2042.7	1018.5	992	860.6	828
220	1718.0	942.2	908	613.4	796
252	1422.4	730.5	711	637.5	606
288	1216.3	685.8	674.0	602.5	583
344	1122.8	585.5	555	495.7	471

Table CII

WEIGHTS AND VOLUMES OF JUICE

Kind	Size	Weight per dozen	Unstrained Juice: Weight in grams	Unstrained Juice: Volume in milliliters	Strained Juice: Weight in grams	Strained Juice: Volume in milliliters
Florida Pineapple	150	3068.1	1795.5	1610.0	1549.8	1486
"	176	2613.4	1490.6	1440.0	1314.9	1296
"	200	2368.2	1283.8	1243.0	1124.3	1068
Florida Round	Bulk	2041.4	1136.3	1101.0	1036.9	1002
Florida Valencia Expressed	Bulk	1873.2	1131.0	1064.0	1007.0	960
Florida Valencia U. S. #1	Bulk	2767.9	1693.7	1656.0	1461.0	1410
U. S. #2	Bulk	2853.4	1623.8	1574.0	1529.1	1453
U. S. #3	Bulk	3641.6	2160.2	2126.0	1999.7	1954
Florida Temple	126	3511.1	2094.4	2042.0	1764.1	1710
" "	150	2908.1	1904.9	1844.0	1614.7	1554
" "	176	2497.4	1622.6	1566.0	1415.9	1360
Texas Navel	Bulk	2618.6	1469.4	1408.0	1368.0	1319

Table CIII

PERCENTAGE AND COST OF JUICE

(Florida Valencia Oranges)

Size	Strained juice in ounces	Cost per dozen	Cost per ounce strained juice	Percentage of original weight in strained juice
96	82.541	$ .35 R	.0042	49.38
100	84.401	.36 R	.0042	51.16
126	65.620	.25 R	.0041	50.06
150	58.567	.22 R	.0037	59.54
176	41.592	.20 R	.0046	55.07
200	39.292	.17 R	.0044	55.61
216	43.350	.16 R	.0036	59.69
250	34.321	.13 R	.0037	57.33
288	27.728	.11 R	.0039	55.99
324	25.699	.10 R	.0040	50.16

R -- Retail Price

Table CIV

PERCENTAGE AND COST OF JUICE

(California Navel Oranges)

Size	Strained juice in ounces	Cost per dozen	Cost per ounce strained juice	Percentage of original weight in strained juice
100	43.688	$ .48 W	.0108	35.83
126	40.983	.40 R	.0097	42.05
150	34.288	.24 W	.0072	45.44
176	30.723	.18 W	.0062	41.64
200	27.998	.24 R	.0087	42.13
220	26.916	.23 R	.0085	48.39
252	20.491	.17 R	.0082	44.81
288	19.713	.12 R	.0063	49.53
344	15.926	.10 R	.0062	44.14

R - - Retail Price

W - - Wholesale Price

Table CV

PERCENTAGE AND COST OF JUICE

(Various Varieties of Oranges)

Kind	Size	Strained juice in ounces	Cost per dozen	Cost per ounce strained juice	Percentage of original weight in strained juice
Florida Pineapple	150	50.248	$ .16 W	.0031	50.51
"	176	42.910	.20 R	.0044	50.31
"	200	36.114	.11 W	.0031	47.47
Florida Round	Bulk	33.882	.15 R	.0042	49.08
Florida Valencia Expressed	Bulk	32.462	.24 R	.0073	60.22
Florida Valencia					
U. S. #1	Bulk	47.678	.16 R	.0033	52.78
U. S. #2	Bulk	49.132	.15 R	.0030	53.58
U. S. #3	Bulk	66.073	.15 R	.0022	54.91
Florida Temple	126	57.823	.35 R	.0065	50.24
" "	150	52.548	.30 R	.0057	55.52
" "	176	45.987	.20 R	.0043	56.69
Texas Navel	Bulk	44.601	.21 R	.0047	52.24

R --- Retail Price

W --- Wholesale Price

TABLE CVI

PRICES OF CITRUS FRUITS AT CHAIN STORE A

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939

State of Origin Oranges	Variety	Size	Unit	Dates	Price
Florida	Pineapple	Med.	10 lb.	Jan. 28	$ .29
	"	"	"	February 1 to 11	.33
	"	"	"	March 1 to 4	.33
Florida	Valencia	Med.	10 lb.	March 4 to 29	$ .35
	"	"	"	April 1 to 4	.37
	"	"	"	April 8 to 15	.39
Calif.	Navel	176	Dozen	April 8 to 15	$ .34
	"	200	"	March 1 to........April 15	.25
	"	220	"	Jan. 28 to ......February 2[illegible]	.23
	"	"	"	February 25	.25
	"	252	"	March 4 to 18	.12½
	"	"	"	March 2[illegible]	.17
	"	288	"	Jan. 28 to...March 1 April 4 to 15	.12½
	"	"	"	March 4 to...April 1	.17
Texas	Navel	Med.	8 lb.	March 15 - 18	$ .29

TABLE CVI

PRICES OF CITRUS FRUITS AT CHAIN STORE A

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939
(Cont'd)

State of Origin	Variety	Size	Unit	Dates	Price
Grapefruit					
Florida	Duncan	Med.	Each	January 28 to ......February 18	$ .031/6
	"	76	"	January 28 to ....April 15	.06 1/3
	"	96	"	February 22 to March 4	.02 11/12
Texas	Marsh	54	Each	January 28 to ...February 11	$ .06 1/3
	"	96	"	February 8 to 15	.03 1/3
Texas	Thompson pink	80	each	January 28 to ...March 18	$ .05 2/3
	"	"	"	March 22 to April 15	.04 3/4
Lemons					
Calif.	Sunkist	300	Dozen	January 28 to ....April 15	$ .39
Limes		Not sized	Dozen	January 28 to February 1	$ .29
		"	"	February 4 to ....April 15	.33
Tangerines					
Florida		344	Dozen	January 28 to February 8	$ .10
		246	Dozen	February 11 to 18	.10

PRICES OF CITRUS FRUITS AT CHAIN STORE B

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939
(Cont'd)

State of Origin	Variety	Size	Unit	Dates	Price
Grapefruit					
Florida	Duncan	46	Each	January 28 to February 8	$ .05
	"	70	"	February 8 to 18	.03 4/5
	"	80	"	April 15	.03 1/6
	Marsh	64	"	January 28 to February 4	.03 4/5
	Indian River	70	"	March 4	.04 5/6
Texas	Marsh	Bulk	Each	February 1	$ .05 4/5
	"	54	"	February 18	.04 1/6
	"	54	"	March 4	.04 3/4
	"	65	"	March 4	.03 4/5
	Thompson	64	"	March 4	$ .06 ½
	"	80	"	January 28 to February 18	.05 2/3
Lemons					
Calif.	Sunkist	300	Dozen	January 28 ....April 15	$ .39
Limes					
Florida			Dozen	January 28 to ....February 18	$ .29

TABLE CVI (CONT'D)

PRICES OF CITRUS FRUITS AT CHAIN STORE B

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939

State of Origin Oranges	Variety	Size	Unit	Dates	Price
Florida	Pineapple	200	Dozen	January 16 to ....February 13	$ .19½
	Valencia	150	Dozen	April 8 to 15	$ .24½
		176	"	March 8	.19½
		176	"	April 15	.24½
		200	"	April 8	.19½
Calif.	Washington Navels	126	Dozen	April 8	$ .39½
	"	150	"	March 4	.29
	"	176	"	January 28 February 18 to Mar.1	.29
	"	176	"	February 8 to 15 March 4	.24½
	"	200	"	January 28 to February 18 April 15	.24½
	"	200	"	March 4	.19½
	"	220 200	"	January 28 to February 18 April 15	.24½
	"	200 220	"	April 1 to 8	.22½
	"	252 288	"	January 28 to February 8	.17½
	"	252 288	"	February 18 April 8 to 15	.14¼

TABLE CVI
(Con't)

PRICES OF CITRUS FRUITS AT INDEPENDENT STORE A

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939

State of Origin	Variety	Size	Unit	Dates	Price
Oranges					
Florida	Valencia	200	Dozen	February 1 to .... April 15	$ .29
	"	252	"	January 28	.17½
	Seedling *	Bulk	Lb.	January 28 to .....March 4	.06
Calif.	Washington Navel	200	Dozen	January 28 to....February 18	$ .33
	"	216	"	February 4	.[illegible]½
	"	216	"	February 18 to March 4	.21
	"	252	"	January 28	.17½
	"	252	"	February 1	.26
Grapefruit					
Texas	Marsh	80	Each	January 28 to February 1	$ .04¼
	"	80	"	February 4 to March 1	.06 1/5
	"	80	"	March 4 to ....April 15	.05¾
	"	96	"	January 28	.03 1/3
	"	96	"	February 1 to March 4	.04 1/4

* Shipped direct from grower by express 40 lb. net cost dealer $.75 plus $1.00 express charges.

TABLE CVI
(Con't)

PRICES OF CITRUS FRUITS AT INDEPENDENT STORE A

EAST LANSING, MICHIGAN

JANUARY 28 to APRIL 15, 1939

State of Origin	Variety	Size	Unit	Dates	Price
Grapefruit Con't					
Texas	Thompson	64	Each	April 15	$.07
	"	70	"	January 28 to February 8 to 16	.08 1/3
	"	80	"	February 1 to 4 April 8 to 15	.08 1/3
	"	80		March 4	.07 2/3
Lemons	Sunkist or Independent	300	Dozen	January 28 ....April 15	.39
Tangerines	176		Dozen	January 28	.17
	"		"	February 4	.19
Box mixture of all citrus fruits			48 lb. gross	February 15	$3.00

Table CVII

WEIGHTS OF ORANGES ON STORAGE EXPERIMENT

FLORIDA VALENCIA

(Size 150 - Weight to the nearest .1 gram)

	Juiced at once:	Stored in Refrigerator:			Stored in Common Storage for one week:		
	Weight	Original Weight	Weight After One Week	Loss	Original Weight	Weight After One Week	Loss
1.	237.9	292.0	288.7	3.3	253.3	232.9	20.4
2.	271.0	253.7	250.2	3.5	254.0	238.6	15.4
3.	263.1	251.3	248.0	3.3	233.4	215.0	18.4
4.	244.1	249.9	247.2	2.7	277.0	256.9	20.1
5.	236.9	239.0	236.4	2.6	242.1	221.4	20.7
6.	256.2	252.8	249.0	3.8	245.8	229.0	16.8
7.	254.9	238.8	236.3	2.5	245.8	224.3	21.5
8.	245.0	273.7	269.9	3.8	216.9	199.9	17.0
9.	235.7	233.9	231.8	2.7	249.2	231.0	18.2
10.	228.9	294.9	291.8	3.1	256.8	237.6	19.2
11.	236.2	231.9	229.7	2.2	234.0	215.4	18.6
12.	270.0	241.4	238.8	2.6	243.8	224.7	19.1
Totals	2979.9	3053.3	3017.4	36.1	2952.1	2777.7	225.4
Average	248.325	254.441	2514.5	3.0	246.008	231.4	18.78

Table CVIII

JUICE YIELD OF ORANGES

ON STORAGE EXPERIMENT

	Original weight per dozen	Unstrained Juice: Weight in grams	Unstrained Juice: Volume in milliliters	Strained Juice: Weight in grams	Strained Juice: Volume in milliliters	Juice calculated as percentage of original weight
(Florida Valencias)						
Juiced at once	2979.9	1941.5	1885	1792.5	1746	60.15
Juiced after storage for one week at 40-50°F.	3053.3	1906.6	1866	1647.3	1604	53.9
Juiced after storage in storeroom for one week at 70-80°F.	2952.1	1765.4*	1802.9*	1665*	1631*	54.5
(California Navels)						
Juiced at once	1671.5	861.4	834.	722.	694	43.19
Juiced after storage for one week at 40-50°F.	1666.5	882.0	834.	710.	683	42.6
Juiced after storage in storeroom for one week at 70-80°F.	1678.4	862.6	834.	712.1	690	42.4

* - - ¼ of one orange spoiled, figures weighted to account for this.

Table CIX

Maximum and minimum diameters for the different sizes of oranges and grapefruit as packed in Florida boxes

Size	Diameter of oranges Minimum - Maximum In Inches		Size	Diameter of grapefruit Minimum - Maximum In Inches	
	Minimum	Maximum		Minimum	Maximum
96's	3 6/16	3 11/16	36's	5	5 9/16
126's	3 3/16	3 8/16	46's	4 11/16	5 2/16
150's	3	3 4/16	54's	4 6/16	4 13/16
176's	2 14/16	3 2/16	64's	4 3/16	4 9/16
200's	2 12/16	3	70's	3 15/16	4 5/16
216's	2 10/16	2 14/16	80's	3 12/16	4 2/16
250's	2 8/16	2 12/16	96's	3 9/16	3 15/16
288's	2 6/16	2 10/16	126's	3 5/16	3 11/16
324's	2 4/16	2 8/16	--	--	--

Table CX
Size of the tissue wraps used on citrus fruits in the Gulf Coast States

Size of tissue wrap	Size of citrus fruits		
	Tangerines	Oranges	Grapefruit
9 by 9 inches	250's and smaller	--	--
10 by 10 inches	196's and 216's	250's and smaller	--
11 by 11 inches	168's, 144's	200's, 216's	--
12 by 12 inches	120's and larger	176's and larger	--
13 by 13 inches	--	--	126's
14 by 14 inches	--	--	96's
15 by 15 inches	--	--	64's, 70's, 80's
16 by 16 inches	--	--	46's, 54's
17 by 17 inches	--	--	36's

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Traub, Hamilton and Robinson, T. Ralph

    Improvement of Subtropical Fruit Crops; Citrus. Yearbook of Agriculture, 1937. United States Department of Agriculture, Washington, D. C., 1937.

2. Car-lot Shipments of Fruits and Vegetables.

    Years 1932-1937. Published by the Bureau of Agricultural Economics, United States Department of Agriculture.

3. Car-lot Unloads of Certain Fruits and Vegetables in 66 Cities and Imports in Four Cities for Canada.

    Years 1932-37. Published by the Bureau of Agricultural Economics, United States Department of Agriculture.

4. Gardner, Kelsey B.

    Terminal Fruit Auctions as Marketing Agencies for Farmers' Cooperatives. Farm Credit Administration Bulletin No. 29, November 1938.

5. Willson, H. F.

    Marketing Florida Citrus, Summary of 1937-1938 Season, United States Department of Agriculture and Florida State Marketing Bureau, Lakeland, Florida, September 3, 1938.

6. Scott, John M., Howard, R. H., Scruggs, Frank H. and others.

    Citrus Growing in Florida. State of Florida, Department of Agriculture, Bulletin No. 2, New Series, August, 1937.

7. Thompson, J. M.

    The Orange Industry: An Economic Study. University of California, College of Agriculture, Agricultural Experiment Station, Berkeley, California, Bulletin 622, June 1938.

8. Auction Sales, Season 1937-38.

    Florida Citrus Exchange, Statistical Department Published August 8, 1938.

9. Statistical Bulletin, Florida Citrus Exchange.

    Season 1937-38. Florida Citrus Exchange, September 22, 1938.

10. Summary of Shipments, Season 1937-38.

Florida Citrus Exchange, August 8, 1938.

11. Wyse, Olive Gertrude

A Study of Consumers' Problems in the Selection of Certain Foodstuffs. Master's Degree Thesis, University of Iowa, June 1933.

12. Ramsey, Ellen M.

Story of the Citrus Fruits
F. A. Owen Publishing Company, Dansville, N. Y. (1928)

13. Coit, J. Eliot

Citrus Fruits
The Macmillan Company, New York, N. Y. (1915)

14. Traub, H. T., Camp, A. F., Gaddum, L. W. and Stahl, A. L.

Type, Variety, Maturity and Physiological Anatomy of Citrus Fruits as Affecting Quality of Prepared Citrus Juices.
University of Florida, Agricultural Experiment Station, Bulletin 243, (May 1932) Gainesville, Florida.

15. Hume, H. H.

The Cultivation of Citrus Fruits.
The Macmillan Company, New York, N. Y. (1926)

16. Shamel, A. D., Pomeroy, C. S., and Caryl, R. E.

Bud Selection in the Washington Navel Orange Progeny Tests of Limb Variations.
United States Department of Agriculture Technical Bulletin 123 (1929)

17. Friend, W. H.

Citrus Orchard Management in the Lower Rio Grande Valley. Texas Agricultural Experiment Station, Circular No. 67. (1933)

18. Greater New York Dietetic Association

A Study of Oranges Used for the Extraction of Juice. Chairman of Committee, Adeline Wood.

19. Bailey, Liberty Hyde

Manuel of Cultivated Plants
The Macmillan Company, New York, N. Y. (1924)

20. Thomas, John J.

The American Fruit Culturist, 21st Edition.
Orange Judd Company, New York, N. Y. (1903)

21. Teague, Charles C.

Ten Talks on Citrus Marketing
Los Angeles, California, 1939

22. Winston, J. R.

Harvesting and Handling Citrus Fruits in the Gulf States.
United States Department of Agriculture, Farmers' Bulletin 1763, 1937

23. Vosbury, E. D. and Robinson, T. Ralph

Culture of Citrus Fruits in the Gulf States.
United States Department of Agriculture Farmers' Bulletin 1343, 1929.

24. Shamel, A. D., Pomeroy, C. S. and Caryl, R. E.

Citrus Fruits Growing in the Southwest.
United States Department of Agriculture Farmers' Bulletin 1447, 1930.

25. Blythe, Stuart O.

California Citrus,
California--Magazine of Pacific Business, February, 1937

26. Blinks, Ruetta Day and Moore, Willetta.

Food Purchasing for the Home, Second Edition
J. B. Lippincott Company, Chicago, 1932

27. Spurlock, A. H. and Brooker, Marvin A.

Florida Citrus Prices, I
University of Florida, Agricultural Experiment Station, Bulletin 315, September 1937.

28. Spurlock, A. H. and Brooker, Marvin A.

Florida Citrus Prices, II
University of Florida, Agricultural Experiment
Station, Bulletin 317, November 1937

29. Ramsay, H. J.

Cleaning and Sterilizing Packing House Equipment
and Field Boxes.
California Fruit Growers' Exchange, Field Department
Circular No. 336, Los Angeles, California, March 6, 1935.

30. Taylor, J. J.

State of Florida, Citrus Inspection Bureau, Annual
Report, Season 1937-38. Florida 1938

31. Klotz, Leo J.

Nitrogen Trichloride and Other Gases as Fungicides
Hilgardia, Volume 10, (2), Page 27-52, (1936)

32. Armstrong, Paul S.

Annual Report of the General Manager of the California
Fruit Growers' Exchange, for the year ending October 31,
1938.

33. Comish, Newel H.

Cooperative Marketing of Agricultural Products
D. Appleton and Company, New York, N. Y. (1929)

34. Clark, Fred E., and Weld, L. D. H.

Marketing Agricultural Products
The Macmillan Company, New York, N. Y. (1932)

35. Winston, J. R.

Reducing Decay in Citrus Fruits with Borax.
United States Department of Agriculture, Technical
Bulletin No. 488, October 1935.

36. Hamilton, H. G. and Brooker, Marvin A.

A Study of the Cost of Handling Citrus Fruit from the
Tree to the Car in Florida.
Florida Agricultural Experiment Station, Bulletin 266,
Gainesville, Florida, April, 1934.

USE ONLY

H889 121486

..ffman

MICHIGAN STATE UNIVERSITY LIBRARIES
3 1293 03061 8346