

T H E S I S

ECONOMIC PROBLEMS IN THE PRODUCTION AND MARKETING
OF CANTALOUPE
IN THE ARKANSAS VALLEY OF COLORADO

Submitted by
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for the Degree of Master of Science
Colorado Agricultural College
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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER
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A. INTRODUCTION

INTRODUCTION

This subject was selected because the production of cantaloupes is a very important industry in the Arkansas Valley of Colorado, and up to the present time there has been no complete survey or study made of its entirety, and practically none from an economic standpoint on any phase of it in Colorado.

The development of cantaloupe production has a touch of romance connected with its history. Rocky Ford has the undisputed honor and distinction of being the first locality in the United States where cantaloupes were produced on a commercial scale. As a result of this the name "Rocky Ford" always carries with it the suggestion of cantaloupes.

Cantaloupes in many places are generally classed as being synonymous with muskmelons, but in this western country they are considered as being of a distinct type, differing somewhat from the true muskmelon. They belong to the gourd family (cucurbitacia) and are supposed to be native of Asia. They were first grown in Europe near the Castle Cantalupa in Marca d'Ancona, Italy, from which place they derived the name of cantaloupe.

While this is primarily a study of the industry in the Arkansas Valley of Colorado, it is important that the local situation should be studied in its relation to other districts where cantaloupes are being produced on a commercial scale, and also in its relation to the production

in all parts of the United States. There is need also for a detailed study of marketing, transportation, and distribution, and other factors affecting the industry as a whole.

This thesis, therefore, is a study in detail of production methods in the Arkansas Valley, adaptation to soil, climate and other existing conditions; how the crop fits in with other crops in rotation, the manner of harvesting, system of marketing, methods of transportation and distribution, also costs of production, financing and other phases of the industry.

Surveys were made in the Imperial Valley and Turlock districts of California, the Phoenix section of Arizona and the Las Cruces district of New Mexico.

Markets were visited at Kansas City, St. Louis, Louisville, Chicago, Detroit, Buffalo, Washington, New York and Boston where marketing methods were observed. A study was also made of the cantaloupe seed industry. A seed breeding project was carried over a period of five years. Selections were made each year for type, maturity, yield, and more especially for flavor and eating qualities.

CHAPTER 1

HISTORY OF THE CANTALOUPE INDUSTRY
IN THE ARKANSAS VALLEY

Among the very early white settlers in the Arkansas Valley of Colorado was Mr. George W. Swink, who in 1870 established a trading post at a rock bottom crossing in the Arkansas River, about 50 miles east of Pueblo. This crossing had been frequently used by the famous Indian Scout, Kit Carson, who had called it the "Rocky Ford" and from this the present city of Rocky Ford received its name.

Mr. Swink had acquired large tracts of land in this region and as home-seekers began to come in, he always made an effort to get them located on a smaller tract in this district. As the country developed and irrigation came into use there was need for more intensive farming. In 1884 Mr. Swink planted some melon seeds which he had obtained from Burpees in order to see if cantaloupes could be grown in this section. The resulting crop proved that melons could be successfully grown, and thus the melon or cantaloupe industry had its inception at Rocky Ford. The melons grown that first year by Mr. Swink were of an unknown variety, rather coarse, irregular in type with various degrees of netting and ribbing.

The following year Mr. J. W. Eastwood of Rocky Ford, and Mr. J. E. Gauger of La Junta, each grew some melons which were evidently a forerunner of the netted gem variety. This seed was also obtained from Burpees and the resultant

crops from these two trials showed promise of being well adapted to this section and were also of a uniform and desirable type. In the fall of that year, 1885, Mr. Swink made some seed selections from the Eastwood melons, which was the first attempt made in the improvement of the Rocky Ford cantaloupes.

During that season some of these cantaloupes were shipped to Leadville, which was then a flourishing mining town, and there found a ready sale at comparatively high prices. They averaged about \$6.50 for what would be contained in a standard crate, however, no crates were used at that time, the melons being packed in barrels, baskets, or boxes of various sizes, shapes and descriptions. The good prices received for these cantaloupes at Leadville stimulated interest in production and the following year quite a number of farmers planted a small acreage. The markets at Leadville and other mining towns continued to be good and for several years, as a result, the growers found a ready outlet for their melons. As time went on more melons were grown and as the demand in the mining towns was limited, it became necessary for the growers to find new markets.

The melons thus far had all been shipped either by express or by freight in less than carload lots. They were also shipped in nondescript containers of all sizes and descriptions. It became evident that if distant markets were to be supplied, they must be shipped in carload lots and

also that there must be some sort of standard container. In 1893 some of the shippers had made some rough crates which held about 45 melons and quite a few melons that year were shipped in these crates. The following year, 1894, the first mill-made crates came into use and that season the first car-load of Rocky Ford cantaloupes packed in standard crates was billed to Denver. This made possible the expansion of the melon industry in this valley and in 1895 a number of car-loads were shipped to commission firms in Denver. In 1896, Mr. G. W. Swink and Mr. A. C. Comer shipped a few cars to Kansas City and St. Louis, thus opening up new markets in out-of-state cities. In 1896 the first Melon Growers' Marketing Association was organized at Rocky Ford with a large membership. This Association in 1897 shipped 131 cars to the Western Poultry and Game Company at St. Louis, for which they received an average of 75 cents per crate f.o.b. Rocky Ford. As an experiment one car was shipped to New York City, thus opening up the largest future cantaloupe market in the United States. It was a very profitable season for the growers, and the enthusiasm ran high. The St. Louis firm also was well pleased with the results of the season and they agreed to pay the growers $97\frac{1}{2}$ cents per crate for the 1898 crop.

The Association had become quite popular and its membership was now increased to over 800. There were over 5,000 acres planted in 1898 which with favorable weather conditions produced exceptional yields. As the melons began to ripen,

the growers began to load cars, and soon the road between Rocky Ford and St. Louis was lined with carloads of Rocky Ford cantaloupes. The St. Louis markets were soon glutted, but the melons continued to roll. The shippers and buyers did not realize what was happening until it was too late. Many cars were diverted to other cities, especially to New York, but as refrigeration had not yet come into use, the melons were pretty much spoiled by the time they got into these markets. Over 500 cars were dumped in New York City and the freight charges on these were never paid. The St. Louis firm was unable to meet its obligations and the freight bills and returns to the growers remained unpaid. The season thus ended in utter disaster and the Melon Growers' Association dissolved.

In spite of the complete failure of 1898, many of the growers did not lose faith in the industry. The following year a number of small groups of farmers were loosely organized to ship cantaloupes collectively. One was known as the Kouns Party, which made a deal with the H. Woods Commission Company of Chicago, and consigned their melons to this firm for which the returns were prorated on weekly pools to the growers. A number of other small groups near Rocky Ford formed a sort of federation and consigned their melons mostly to the firm of Lyons and Coggins of New York and Pittsburgh, also on a commission basis, and returns to the growers were made on weekly pools.

The acreage had been reduced considerably to what it was the previous year and by the shippers consigning to various cities, they did not glut the markets, and there was a fair return to the growers for the season. During the next few years there was a marked improvement to all phases of the industry. There was a gradual increase in acreage, but the market demands were also gradually increasing and the Rocky Ford cantaloupes soon became known in many of the important consuming centers. The average prices during these years were quite satisfactory and by 1904 the growers had gotten over the severe jolt of 1898. By this time the Rocky Ford cantaloupe had attracted the attention of fruit commission firms and distributors in all parts of the country, and agents representing various firms flocked into the Rocky Ford territory in order to get a share of the business. Some of these agents and distributors were not altogether scrupulous in their dealings. Also there were many new ones who lacked experience in handling this commodity. A large acreage was again planted, but the quality was poor due to excessive wet weather during harvest. This poor quality together with the faulty systems of marketing for the 1904 crop resulted in another unprofitable season. The following year the acreage was again reduced and as the growers profited by the mistakes of the previous year, again made a fair return on what was shipped to market.

The history of the cantaloupe industry from the time of its inception is one of periodic disasters, due partly to over production in such seasons and to the mismanagement of shipments. These disasters were usually followed by reduced acreages and more careful and conservative shipping, and in the main, as long as these conditions prevailed there was usually a fair return to the grower. When an exceptionally good season was experienced, it would again be followed by an excessive acreage with more inexperienced growers and more reckless shippers in the business, and again the result was an unprofitable season.

CHAPTER 2

CLIMATIC AND WEATHER CONDITIONS

The successful production of cantaloupes is largely dependent upon proper climatic and weather conditions. Cantaloupes are greatly influenced by moisture, temperature and sunlight. They require considerable moisture during the growing season in order to develop strong, healthy vines with an abundance of foliage, which is necessary for the proper netting or maturing of the fruit. Besides an abundance of moisture, they also need a relatively warm temperature, and a growing season of from 120 to 140 days between frosts.

Mean atmospheric temperatures of from 70 to 80 degrees Fahrenheit during the time after the blossoms begin to appear until the fruit has matured is quite favorable for the growing of cantaloupes. The maximum temperatures under these conditions may rise to as high as 90 to 100 degrees, or even higher at short periods of time. However, in extremely hot weather the fruit often ripens too quickly or prematurely.

After the fruit has reached the stage where it begins to show signs of netting, a dry atmosphere and an abundance of sunshine are essential. It is at this stage that the sugar and flavor are given to the ripening fruit, and sunlight is necessary to bring this about. Excessive moisture and cloudy weather just before harvest almost invariably result in poor quality of cantaloupes.

Those sections of the country where the commercial production of cantaloupes has been established on the most extensive scale are the sections of the arid, or semi-arid southwest under irrigation such as the Rocky Ford district in Colorado, the Salt River Valley of Arizona, the Imperial Valley and Turlock districts of California, the Yuma district of Arizona, and the Missilla Valley of New Mexico. These are the most important producing sections of the West, but there are many other sections in these and other states where conditions would be favorable for the production of cantaloupes. While the western states perhaps have the most ideal growing conditions for cantaloupes, yet they can be and are being produced in nearly every state in the Union. Some 25 states are at present growing cantaloupes on a commercial scale.

Climatic conditions in the Rocky Ford district are generally considered most favorable for the production of cantaloupes. The main producing area is located from 50 to 150 miles from the foothills of the Rocky Mountains, upon which the Arkansas Valley depends for the source of its irrigation waters. The altitude ranges from 3500 feet elevation at Lamar to 4500 feet near the city of Pueblo, the mean altitude being about 4200 feet which is the elevation in the vicinity of Rocky Ford. The rainfall in this section is quite low. The average annual precipitation as recorded by the Colorado Branch Experiment Station

at Rocky Ford over a period of 25 years is 12.12 inches. It ranges from 5.86 inches for the lowest to 21.82 inches for the highest during this period. The greatest precipitation comes during the months of April, May, June, July and August. September is usually dry and clear as are most of the other months during the fall and winter. There is very little snow and the winters are usually quite mild, with occasional extremely cold spells of short duration. The average date of the last killing frost in the spring over the 25-year period is on May 5th. It ranges from April 16th to May 24th. Frosts doing slight damage to some crops have been recorded as late as June 10th, but the crops were able to make recovery in these instances. The average date for the first killing frost in the fall is October 5th. It ranges from September 20th to October 28th. These records show that there is an average season of 153 days between killing frosts, with an absolute season of 120 days between frosts.

The average mean temperature by months in this district as recorded for a period of 25 years is as follows:

January	30.07	July	75.93
February	33.77	August	73.56
March	42.57	September	65.35
April	51.18	October	53.35
May	60.22	November	40.65
June	70.38	December	29.61

The temperature during the day in the months of July and August frequently goes above 100 degrees Fahrenheit

in the shade. The nights, however, generally drop below 60 degrees. Extreme temperatures have been recorded as follows: During the 1927 season the temperature in June reached a maximum of 104 degrees; in July the highest temperature was 98 degrees; in August the highest was 90 degrees; and in September the maximum point reached was 92 degrees. In 1928, June showed a maximum temperature of 92 degrees; July showed the high point that year of 100 degrees; August reached a maximum of 97 degrees; and in September the high point was 92 degrees.

The degree of evaporation is an important factor in crop production. The evaporation in this region is generally quite high. As high as 60 inches annual evaporation have been recorded. Records kept by the American Beet Sugar Company's research department show that in 1927 over a period of eight months, from April to November, there was a total evaporation of 60.15 inches. The highest was in June when there was an evaporation of 8.98 inches. Over a period of seven months in 1928, April to October, the total evaporation was 50 inches.

Table 1
MONTHLY DISTRIBUTION OF RAINFALL AT ROCKY FORD, 1899-1925

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1899	.98	.55	.32	.28	.99	.78	7.0	2.22	1.43	.63	2.40	.98	18.56
1900	.0	.52	.37	7.16	2.28	1.47	1.78	1.05	.08	.60	.06	.24	15.61
1901	.20	.10	1.0	2.36	1.34	.23	1.48	.74	.48	.25	.0	.50	8.68
1902	.18	.57	1.78	.18	4.02	.60	.72	2.72	.46	.80	.41	.33	12.77
1903	.0	1.05	.18	.56	.28	3.94	.42	.87	.0	1.02	.26	.22	8.80
1904	.0	.0	.77	.81	2.03	2.20	1.75	.33	2.34	.50	.0	.31	11.04
1905	.0	.11	2.11	4.67	2.13	1.56	1.30	.45	1.48	.10	.41	.0	14.32
1906	.23	.10	.92	5.59	.59	.54	2.05	1.21	1.64	1.57	.22	.0	14.66
1907	.0	.0	.0	1.84	1.85	.65	4.96	.78	.33	.88	.02	.26	11.57
1908	.18	.35	.0	.14	.89	1.16	2.65	2.89	.0	1.96	.86	.0	11.08
1909	.15	.15	.65	.98	.75	1.21	.65	2.52	1.72	.90	1.07	.14	10.89
1910	.0	.27	.35	2.70	1.93	.27	3.58	1.20	.0	.0	.43	.0	10.73
1911	.0	.65	.05	.60	.65	.67	1.51	.69	.12	1.25	.20	1.16	7.55
1912	.16	.70	.16	.65	1.70	1.57	1.22	.82	1.77	.40	.0	.0	9.15
1913	.17	.62	.0	1.65	.42	2.87	2.82	.0	.54	.77	.67	2.32	12.85
1914	.0	.14	.35	2.90	3.38	2.68	3.09	.87	1.18	1.60	.0	.30	16.49
1915	.10	.91	.51	3.64	4.55	1.10	3.36	3.22	.69	.22	.15	.30	18.75
1916	.0	.0	.32	1.78	.80	.88	.45	4.52	.0	.28	.10	.31	9.44
1917	.17	.22	.35	.89	1.52	.25	1.60	1.18	2.45	.12	.0	.0	8.75
1918	.56	.0	.35	.57	.35	2.70	1.79	1.10	1.54	.21	.20	1.14	10.51
1919	.06	.46	1.20	3.10	1.93	2.68	3.66	.25	.15	2.51	.80	.20	17.00
1920	.10	.21	.0	1.60	1.35	.82	3.07	.85	.65	1.75	.0	.05	10.45
1921	.65	.12	.55	1.03	.69	2.35	3.39	1.44	.0	.62	.12	.40	11.36
1922	.0	.12	.21	1.46	1.63	.55	1.28	.33	.0	.0	.97	.0	6.55
1923	.0	.30	.20	.32	6.27	4.16	2.39	3.99	.85	3.18	.16	.0	21.82
1924	.15	.05	1.11	1.29	.93	.27	.79	.0	.20	.47	.0	.60	5.86
1925	.34	.0	.0	.47	4.41	1.21	5.98	1.23					
Av.	.16	.31	.51	1.82	1.84	1.46	2.40	1.39	.77	.87	.37	.38	12.12

Red lines show time of last killing frost in spring and first killing frost in fall.

CHAPTER 3

IRRIGATION IN THE ARKANSAS VALLEY

Since the rainfall in the Arkansas Valley of Colorado is extremely low, and as cantaloupes require considerable moisture, it is essential to have sufficient irrigation water to properly produce this crop. Cantaloupes cannot be grown in this section without irrigation. There are a number of different ditches and systems in this valley and while nearly all of them have sufficient water for cantaloupe production, yet some of these systems have earlier priorities than others, and in some seasons when there is a shortage in the river the crops under some of the late priorities are sometimes affected.

In order to get an understanding as to the amount of irrigation water used by these various ditches it is necessary to know the meaning of the terms used. There are two terms that are most commonly used and these are as follows:

For flowing water, such as flowing down the river or in an irrigation ditch, the term most commonly used is the "second foot" which is a cubic foot of water passing a certain point in a second of time. A second foot of water is equal to 450 gallons per minute.

For reservoir or large quantities of standing water, the term "acre foot" is most commonly used, and this is the amount of water necessary to cover an acre of ground one foot deep. An acre foot is equal to 43,560 cubic feet of

water. A second foot is about equal to two acre feet in 24 hours of time. In an average season a second foot of water will irrigate approximately 60 acres of land.

The following is a tabulation in second feet of water of the decrees of 21 of the major irrigation systems in this district. These 21 systems have a total decree of 5456.28 second feet.

Table II
CAPACITY PER SECOND, DISTRICT NO. 14

	Bessemer	Excelsior	Colorado (Bob Creek)	Rocky Ford	Oxford Farmers
Prior to 1884	58.78			56.00	14.00
1884, March 7					
April 15					
Dec. 3					
1885, Jan. 29					
June				30.00	
1886, March 11				2.00	
April 1					
Nov. 4					
1887, Feb. 21					
Feb. 26					116.00
March 1					
April 16					
May 1	320.00	20.00			
May 10					
Nov. 14					
1888, March 13					
1889, March 10					
July 22					
Sept. 11					
Sept. 25					
1890, Jan. 6		40.00		378.00	
March 3					
May 6					
June 9			756.28		
July 16					
Aug. 12					
Oct. 14				2.50	
1891, Aug. 24					
1893, Aug. 30					
Aug. 31					
Feb. 2					
TOTALS	378.78	60.00	756.28	468.50	130.00

Table II continued

CAPACITY PER SECOND, DISTRICT NO. 17

	Otero	Cutlin	Holbrook	Rocky Ford	Fort Lyon	Jones	Las Animas (town)
Prior to 1884		22.00		111.76		22.30	
1884, March 7						5.50	32.50
April 15					164.64		
Dec. 3		226.00				22.00	
1885, Jan. 29							
June							
1886, March 11							
April 1							
Nov. 4							
1887, Feb. 21							
Feb. 26							
March 1					597.16		
April 16							
May 1							
May 10							
Nov. 14		97.00					
1888, March 13						80.00	
1889, March 10							
July 22							
Sept. 11							
Sept. 25			155.00				
1890, Jan. 6							
March 3	123.00						
May 6				96.54			
June 9							
July 16							
Aug. 12							
Oct. 14							
1891, Aug. 24							
1893, Aug. 30			445.00				
Aug. 31					171.20		
1903, Feb. 2	334.92						
TOTALS	457.92	345.00	600.00	208.30	933.00	129.80	32.50

The ditches under which commercial cantaloupes are grown in this district are as follows:

BESSEMER DITCH.— The Bessemer ditch is one of the most reliable ditches in the district. It has 378.78 second feet of early priorities decreed prior to 1884. The Vineland and Avondale sections, located on the south side of the river in Pueblo County, are watered by this ditch.

BOB CREEK CANAL.— This is the main irrigation canal on the north side of the river in Pueblo and Crowley counties. It irrigates all of the melon growing area in Crowley County. It has 756.28 second feet of water decreed in 1899. It also has a large storage reservoir, Lake Meridith, which is filled during flood times, and emptied back into the river as exchange water.

ROCKY FORD HIGHLINE CANAL.— Here we have one of the largest ditches in the valley, being 90 miles long and furnishing water for 28,000 acres, mostly in Otero County. It has 88 second feet of water dated 1886 and 380.5 second feet decreed in 1890, making a total of 468.5 second feet. This ditch waters much of the melon growing sections on the higher slopes south of Fowler, Manzanola and Rocky Ford.

CATLIN CANAL.— The headgate of the Catlin ditch is near Fowler, Colorado. This system waters most of the bench land between Manzanola and La Junta, consisting of 19,600 acres. It has a decree of 248 second feet dated 1884 and 97 second feet dated 1887, making a total of 345 second

feet.

ROCKY FORD DITCH.- The Rocky Ford ditch is one of the earliest decrees in the Arkansas Valley, having a priority of 111.74 second feet filed in 1874. It has a later decree of 96.54 second feet dated 1890. There are 10,000 acres under the Rocky Ford. It was under this ditch that the first cantaloupes were grown by Senator George Swink.

HOLBROOK SYSTEM.- The Holbrook irrigation district has two main irrigation ditches and two exchange water reservoirs. It has a total decree of 600 acre feet of which 155 feet dates back to 1889 and 445 feet decreed in 1893. There are 19,000 acres under this system.

OXFORD FARMERS DITCH.- The Oxford is a comparatively short ditch located in the Fowler district. It has 14 second feet of early water dated prior to 1884 and 116 feet decreed in 1887.

LA JUNTA CANAL AND RESERVOIR COMPANY.- This was formerly known as the Otero Irrigation District which was organized in 1901. In 1902 this district was given a decree of 327 second feet and a storage reservoir with a capacity of 11,425 acre feet. There were 19,200 acres under the canal. In 1923 the district was reorganized and it is now known as the La Junta Canal and Reservoir Company. At present there are but 8,620 acres under the ditch, which has a total decree now of 465.5 second feet.

FORT LYON CANAL.- The Fort Lyon is the largest irri-

gation system in the Arkansas Valley. Its headgate is located near La Junta and the canal supplies water to all of the Fort Bent district in Otero County, all of the irrigated lands on the north side of the river in Bent County, and the McClave, Big Bend and May Valley sections of Prowers County. It has a total of 933 second feet of water of which 164.64 was decreed in 1884, 597.16 feet in 1887 and 171.2 second feet in 1893. The important cantaloupe producing sections under the Fort Lyon are the Fort Bent district in Otero County, and the Cornelia, Melina, Fort Lyon and Kreybill sections of Bent County.

JONES DITCH.- This ditch supplies the Melonfield and Las Animas sections on the south side of the river in Bent County. It is a small ditch having priorities of 49.8 second feet of early water and 80 second feet decreed in 1888.

LAMAR DITCH.- In recent years a small acreage of cantaloupes has been grown in the Lamar and Morse districts on the south side of the river in Prowers County under the Lamar ditch. The total decree of the Lamar ditch is 285.75 second feet: 15.75 second feet dated prior to 1884, 72.9 second feet dated 1886, 13.64 second feet in 1887, and 184.27 second feet granted in 1890.

The cantaloupe industry has not yet spread to the other ditches located east of Lamar, Colorado.

CHAPTER 4

TOPOGRAPHY AND SOILS

The Arkansas Valley land has a gradual rise from Lamar where the elevation is about 3500 feet, to Pueblo which is 4700 feet. The intervening points are situated as follows:

Las Animas and Fort Lyon 4100; La Junta 4100; Rocky Ford 4250; Manzanola 4250; Fowler 4300; Cheraw 4300; Sugar City 4325; Ordway 4300; Crowley 4275; Olney Springs 4400; and Avondale 4500 feet. Except for this gradual rise from east to west in elevation, the topography of the land in the valley proper is quite level. There is also a gradual slope in the main from the higher lands toward the river. Thus the valley lends itself exceptionally well to irrigation. The soil for the most part is an alluvial or sandy loam, with departures to various degrees of clay, sand or adobe. While the soils generally appear on the surface to be quite uniform, yet there are numerous soil types in different parts of the valley and these soil types have their influence upon the crops that are grown.

A complete soil survey has recently been made of the Arkansas Valley by the United States Bureau of Soil Surveys, and this affords us an interesting study of the relation of soil types to the various kinds of crops grown. The soil types of the Arkansas Valley have been classified and numbered by the Bureau of Soil Surveys and the principal types to be considered in connection with this study

are as follows:

Principal Soils in Prowers County

- No. 10 - Hasty clay loam: Rather fine, dark and heavy.
- No. 12 - Minatare clay loam: Medium texture, grayish brown, medium to heavy.
- No. 14 - Minatare silt loam: Fine texture, grayish brown, medium to heavy.
- No. 20 - McClave sandy loam: Sandy to gravelly texture, medium.
- No. 21 - McClave silt loam: Fine texture, close, medium to heavy type.
- No. 24 - McClave loam: Fine texture, medium to light.
- No. 42 - Prowers clay loam: Medium texture, medium to light.
- No. 60 - Wiley clay loam: Fine texture, dark colored, heavy to adobe.

In general we find in Prowers County that the upland soils are mostly of the Prowers clay loam, No. 42. The slope soils are largely made up of Nos. 20, 21 and 24, designated as the McClave loams. The lowlands are largely of the heavier types known as the Wiley soils, mostly No. 60, which is a Wiley clay loam and quite heavy. The main agricultural sections of Prowers County are what are known as May Valley, Big Bend and McClave.

The upland soils of May Valley and Big Bend are mostly No. 42, while the lower lands are mostly Nos. 24 and 60. In the McClave section we find mostly Nos. 10 and 60 with smaller areas of No. 42. There is a rather distinct divi-

sion of soil types at McClave. Those east of McClave are more of the medium types, while to the west we find more heavy types as Nos. 10 to 21 and 60. The region of heavy types extends as far west as Kreybill in Bent County.

Principal Soils in Bent County

- No. 10 - Hasty clay loam: Fine, dark, heavy.
- No. 12 - Minatare clay loam: Medium texture, grayish brown, medium to heavy type.
- No. 15 - Minatare silt loam: Fine texture, grayish brown, medium to heavy type.
- No. 29 - La Junta fine sandy loam: Medium texture, sandy to gravelly, light to medium type.
- No. 31 - La Junta clay loam: Medium texture, medium to heavy type.
- No. 35 - La Junta silt loam: Fine texture, medium to heavy type.
- No. 60 - Wiley clay loam: Fine texture, heavy type.

The soils on the south side of the river near Las Animas and Melonfield are mostly Nos. 12 and 15 known as the Minatare soils, medium to heavy types. On the north side of the river in the vicinity of Hasty, we have mostly Nos. 10 and 60, both comparatively heavy soils. From Kreybill to the west, in the section around Fort Lyon, Cornelia and Melina, are found mostly Nos. 29, 31 and 35, the La Junta loams, all of medium type soils with varying loams, all of medium type soils with varying degrees of silt and sand and of texture.

Principal Soils in Otero County

- No. 2 - Otero sand: Fine sandy texture, very light, tends to blow.
- No. 4 - Otero loam: Fine texture, slightly heavier than No. 2.
- No. 6 - Otero sandy loam: Fine texture, medium type.
- No. 8 - Otero clay loam: Medium texture, medium type, slightly heavier than No. 6.
- No. 9 - Otero silt loam: Fine texture, medium type.
- No. 15 - Minatare silt loam: Fine texture, medium to heavy type.
- No. 17 - Apishapa silt loam: Medium texture, medium to heavy type.
- No. 18 - Apishapa clay loam: Medium texture, slightly heavier than No. 17.
- No. 23 - Roberta clay loam: Fine texture, medium to heavy type.
- No. 29 - La Junta sandy loam: Medium texture, sandy to gravelly, light to medium.
- No. 31 - La Junta clay loam: Medium texture, medium to heavy type.
- No. 32 - La Junta silt loam: Light sub-soil phase.
- No. 35 - La Junta silt loam: Fine texture, medium to heavy type.

There is greater variation of soils in Otero County on which cantaloupes are grown than in the other counties of the district.

In the La Junta district, including the Fort Bent section of which La Junta and Casa are the loading points, the principal soil types are Nos. 15, 29, 31 and 35, mostly the medium to heavy types with the exception of a few

small areas of No. 29 which is a lighter sandy type.

The Holbrook district, of which Cheraw is the center, is mostly of Nos. 4, 6 and 8, all comparatively light soils. The west end of the Holbrook district is mostly of No. 2 which is very light and sandy. The slopes just above the river bottom and bordering the sandy area are of No. 23, a fine, medium to heavy type.

On the south side of the river in the vicinity of Swink, we have mostly Nos. 17 and 35, both medium to heavy types.

At Hawley to the east along Timpas Creek, we have No. 17, which is a medium to heavy type, and on the higher ground to the west we find mostly Nos. 4, 6 and 8, all comparatively light soils.

Between Hawley and Rocky Ford on the uplands, and extending west as far as Manzanola, we have mostly Nos. 17 and 23, medium to heavy types, interspersed here and there with Nos. 4, 6 and 8, all of the lighter types.

Bordering the south side of the railway from Rocky Ford to Manzanola and east to Newdale, we have a strip which averages about one mile in width of No. 32, a silt loam with a light sub-soil phase. On the north side of the track we have intermittent areas of Nos. 29 and 32. Below the Rocky Ford ditch on the slope toward the river we have mostly No. 15, the minatare silt loam.

From Manzanola to the Pueblo County line we have intermittent areas of Nos. 29 and 32, with a strip of No. 17

along the Apishapa river.

Principal Soils of Crowley County

- No. 2 - Otero sand: Fine sandy texture, very light.
- No. 4 - Otero loam: Fine texture, light soil type, slightly heavier than No. 2.
- No. 8 - Otero clay loam: Medium texture, medium type.
- No. 9 - Otero silt loam: Fine texture, medium type.
- No. 25 - Ordway silt loam: Fine texture, medium to heavy type.
- No. 180 - Ordway silty clay loam: Very fine and close texture, heavy type.

The soils near Sugar City and Ordway are of the rather heavy types, Nos. 25 and 180. Just east of Crowley, along the Bob Creek lateral, we find an area of No. 25, but abruptly bordering it on the west and extending west to Olney Springs, it is mostly Nos. 4 and 8, and a small area of No. 9, all comparatively light soils. South of Crowley and extending almost to the river is a large area of No. 4, dotted with several small areas of No. 2. A region of comparatively light sandy soils.

West of Olney Springs the farm lands are confined to the immediate river bottoms which are mostly of the heavier types.

Principal Soils in Pueblo County

- No. 4 - Otero loam.
- No. 8 - Otero clay loam.
- No. 13 - Minatare silt loam.
- No. 29 - La Junta sandy loam.
- No. 32 - La Junta silt loam.
- No. 51 - Pueblo clay loam.

In Pueblo County most of the farm lands are located on the south side of the river. Beginning at the Otero-Pueblo County line and extending to within a few miles of the Huerfano river, the bench land is mostly No. 32, the La Junta silt loam. On the higher ground bordering this we find Nos. 4 and 8 of the lighter and sandier soils, while in the river bottom we have No. 13, a minatare silt loam. On the south side of the Huerfano river is a strip about 3 miles wide of No. 29, a sandy loam soil. On the north side of the river in the first bottom we have mostly the minatare silt loam, No. 13, and above this on the bench which is a narrow strip, mostly No. 51, called Pueblo clay loam. Also a rather heavy type of soil.

West of Avondale on the north side is largely a continuation of type No. 13 and No. 51, while on the south benches we find mostly No. 32 interspersed with No. 29.

Soils

While it is possible to grow cantaloupes on practically every type of soil found in the Arkansas Valley, yet

there are certain soils which are better adapted to the crop than others. Generally the light to medium types are better suited than the heavy soils. Light to medium sandy loam soils, when they contain sufficient humus and are well drained, usually are best suited. Under certain seasonal weather conditions this may be reversed in some instances, but in general we find that better crops of cantaloupes and better quality are produced on the light to medium sandy loams.

The most favorable soil types for the production of cantaloupes are the light to medium sandy loams such as No. 4, Otero loam; No. 8, Otero clay loam; No. 29, La Junta sandy loam; and No. 32, which is a silt loam with a sandy sub-soil phase.

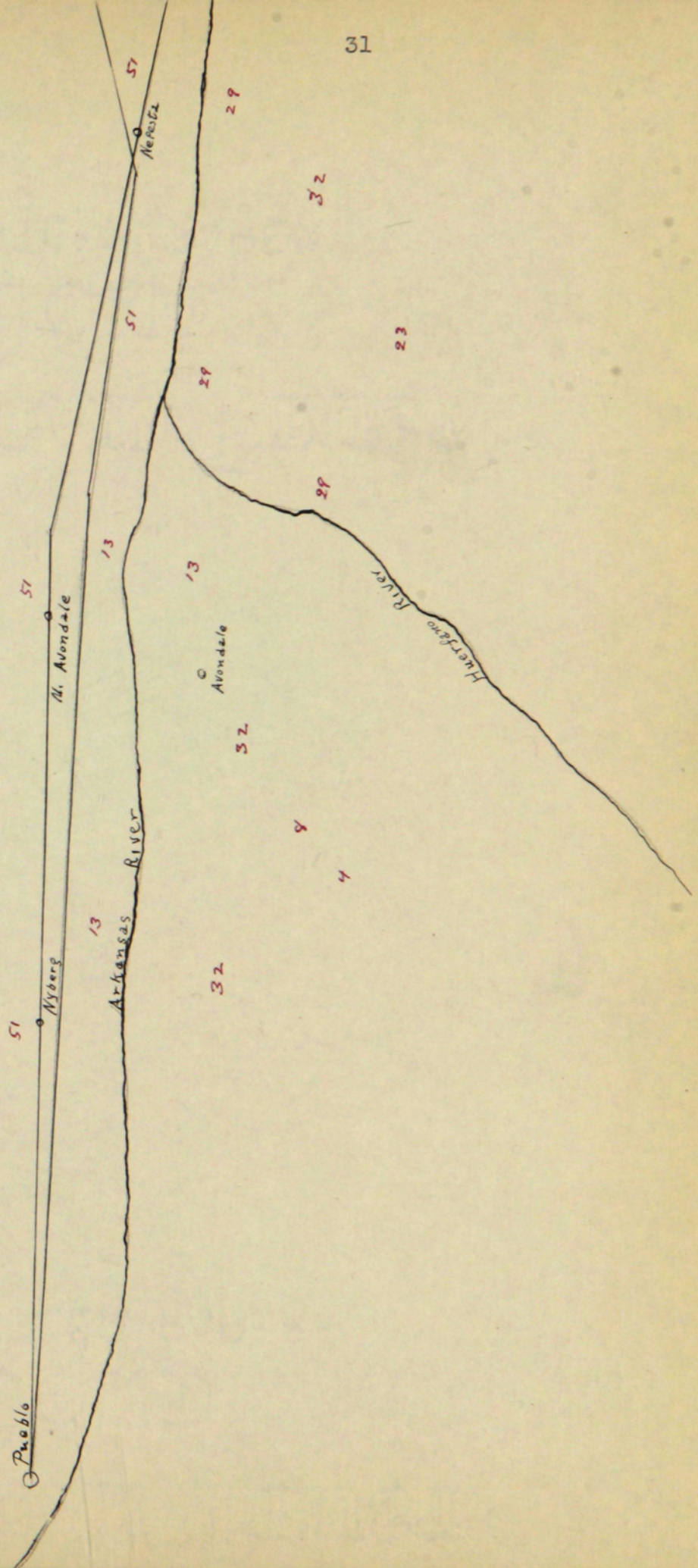
Nos. 4 and 8 are perhaps best adapted from a soil type standpoint. These soils are found in the west part of the Holbrook district, the south and west part of the Crowley district, and south and west of Hawley. No. 4 is a sandy loam and in extremely dry and windy weather has a tendency to blow. No. 8 is a fine light clay loam which does not blow quite so readily as No. 4. Both these types are found mostly on the higher slopes and the question of sufficient irrigation water is often the determining factor in the production of a crop of cantaloupes on these soils.

Nos. 29 and 32, both medium type soils, are well suited for cantaloupe production and these are the types on which

they have been grown most extensively and generally most successfully in past years. These types predominate on the bench lands near Rocky Ford, Manzanola and Avondale on the south side of the river and in the Fort Lyon, Cornelia and Meline districts in Bent County.

Location of soil types

Pueblo County



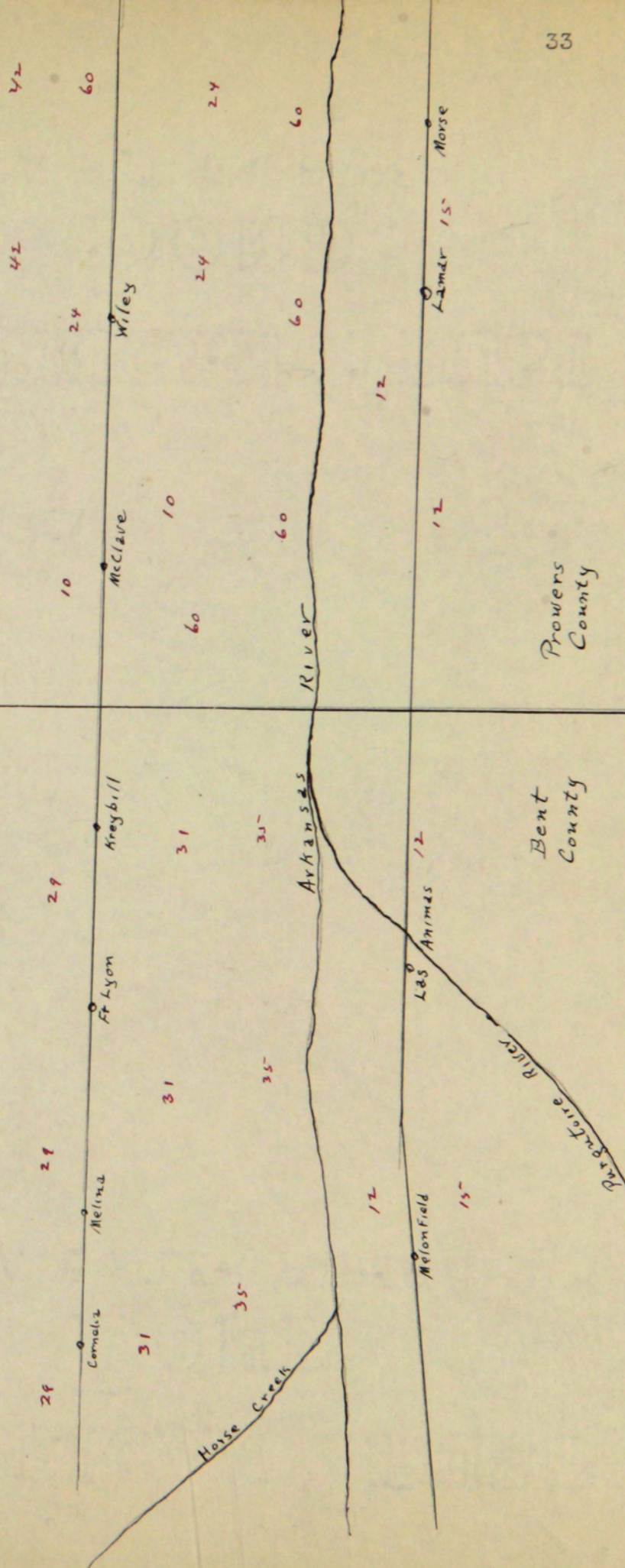
Location of Soil types

Crowley and Otero Counties



Location of Soil types

Bent and Powers Counties



CHAPTER 5
CROPPING SYSTEMS IN THE CANTALOUPE DISTRICT
OF COLORADO

A large variety of crops is being produced in that part of the Arkansas Valley where cantaloupes are extensively grown. Many different kinds of crops are exceptionally well adapted.

In the early history of the country the production of range cattle was the predominating industry, and when irrigation was first introduced it was for the purpose of producing feed crops for the wintering of cattle. The main feed crop, which was alfalfa hay, was supplemented by grain, mostly wheat, oats and barley. The cantaloupe industry was the first intensive agricultural crop to find its place in this region. This was soon followed by other vines, especially honey dews and cucumbers. Cucumbers were chiefly grown for seed. The production of other vine seeds also became one of the major industries of this section.

The seed industry has developed to such stage that there are at present eight large wholesale and retail seed distributing houses located in Rocky Ford and several other smaller seed dealers in La Junta, Rocky Ford and vicinity, handling all kinds of field and garden seeds.

In 1900 the sugar beet industry came into the valley and since that time has held a very important place in the cropping system.

In the early days it was assumed that corn could not be successfully grown, but in recent years corn has become one of the major crops in the valley.

As the country developed and land values increased, more intensive farming systems came into general use. Canning factories were built and the production of canning crops such as tomatoes, green beans, garden beets, etc., has become a part of the cropping system on many farms. The production of other truck crops has been gradually increasing.

In recent years the production of red clover seed has become an important industry, especially in Otero County.

The production of Valencia onions is another new crop which has within a few years developed into a very large and important industry.

The following tables show comparisons of crop acreages in five counties of the Arkansas Valley during the years 1920, 1924 and 1927; also changes in crop acreages in Otero County from 1917 to 1929.

Table III
Comparison of Crop Acreages in Five Counties of the
Arkansas Valley in 1920.

Crop	Pueblo	Crowley	Otero	Bent	Prowers
Alfalfa	34,891	5,206	25,419	10,933	22,935
Corn	9,272	6,733	9,262	3,249	6,116
Sugar beets	3,849	3,033	15,481	3,222	8,196
Wheat	3,947	2,410	4,723	5,238	30,129
Oats	2,384	1,373	5,151	774	2,187
Barley	1,434	2,602	1,266	1,406	2,425
Rye	3,113	87	244	433	1,434
Beans	1,023	104	963	381	36
Cantaloupes:					
Market	13	1,655	4,424	210	2
Seed		50	750		
Honey dews	2	145	766	50	
Watermelons	20	150	450	10	
Cucumbers:					
Pickles	45	95	160		
Seed	150		4,025		
Red clover			79		
Tomatoes	40	90	509	32	
Onions	25		20		
Celery	46		31		
Cauliflower	5		3		
Potatoes	25	3	16	26	2
Zinnias			15		
Miscellaneous	434	363	4,025	17	39

Table IV
Comparison of Crop Acreages in Five Counties of the
Arkansas Valley in 1924.

Crop	Pueblo	Crowley	Otero	Bent	Prowers
Alfalfa	28,169	13,898	21,883	23,230	39,799
Corn	12,781	8,939	12,944	16,005	15,011
Sugar beets	4,200	7,300	16,000	4,300	8,400
Wheat	2,060	232	4,326	4,292	8,315
Oats	2,276	849	3,183	691	1,830
Barley	896	2,253	1,246	1,325	2,781
Rye	222		44	96	276
Beans	13,048	3,031	1,555	1,102	811
Cantaloupes:					
Market	80	2,100	3,307	643	
Seed	38	88	894	39	2
Honey dews	31	110	590	9	6
Watermelons	307	53	397	19	9
Cucumbers:					
Pickles	556	272	1,790	54	39
Seed	218	180	1,676	24	12
Red clover			104		
Tomatoes	37	33	700		
Onions	18		30	3	
Celery	120		11		
Cauliflower	95		4		
Potatoes			13		4
Zinnias			30		
Miscellaneous	481	50	486	35	186

Table V
Comparison of Crop Acreages in Five Counties of the
Arkansas Valley in 1927.

Crop	Pueblo	Crowley	Otero	Bent	Prowers
Alfalfa	28,360	15,290	22,520	26,400	44,970
Corn	10,260	6,110	10,060	11,350	13,880
Sugar beets	4,530	4,680	9,290	2,770	2,780
Wheat	3,320	860	5,550	4,350	7,480
Oats	1,050	1,130	3,580	640	1,060
Barley	2,560	1,970	2,640	3,390	5,470
Rye	180	70	50	10	80
Beans	3,960	1,610	3,270	470	200
Cantaloupes:					
Market	440	4,320	4,950	1,800	170
Seed	20	105	1,250	50	
Honey dews	150	520	950	200	
Watermelons	280	140	160	50	30
Cucumbers:					
Pickles	180	80	430	50	75
Seed	1,390	40	1,420		
Red clover, seed	50		700	20	
Tomatoes	120	80	970	4	6
Onions	70	5	350	40	20
Celery	140		10		
Cauliflower	400				
Potatoes			20	10	10
Zinnias			150		
Miscellaneous	910	120	420	215	300

Table VI
Changes in Crop Acreages in Otero County
1917 to 1929.

Year	Alfalfa	Corn	Sugar beets	Canta- loupes	Seed cucum- bers	Winter wheat
1917	24,700	4,000	16,375	1,700	2,800	2,800
1918	23,000	5,500	15,000	1,850	3,250	5,200
1919	22,331	8,797	12,775	3,836	3,850	5,509
1920	25,419	9,262	15,481	5,174	4,025	3,337
1921	20,415	9,157	11,792	5,697	2,768	4,983
1922	23,465	10,226	10,110	8,316	2,337	5,837
1923	21,651	12,084	10,426	4,528	1,836	3,970
1924	21,883	12,944	16,000	4,201	1,676	2,280
1925	24,793	10,075	11,780	5,133	4,190	2,007
1926	25,020	10,650	8,210	6,210	3,950	2,570
1927	22,520	10,060	9,290	6,200	1,420	2,710
1928	21,850	10,240	10,100	5,150	1,100	2,180
1929	21,000	10,300	16,500	5,500	1,050	2,000

Year	Spring wheat	Oats	Barley	Beans	Red clover	Onions	Toma- toes
1917	700	4,000	2,500	21,000	10		100
1918	550	3,500	1,800	16,500	12		250
1919	456	2,815	652	1,530	29	3	425
1920	1,386	5,151	1,266	963	79	16	509
1921	3,937	4,786	970	671	61	17	53
1922	4,849	2,993	851	1,167	49	87	483
1923	1,800	3,373	1,022	2,270	116	54	688
1924	2,046	3,183	1,246	1,500	104	55	496
1925	1,620	3,595	1,788	1,756	253	60	750
1926	1,800	3,020	1,520	5,160	295	120	1,090
1927	2,840	3,580	2,640	3,130	630	350	970
1928	1,590	3,020	2,460	3,680	1,810	875	635
1929	1,200	3,000	2,500	3,100	2,200	1,850	750

(Acreages for 1929 are early season estimates)

It will be noted that there has been a rather constant yearly acreage of most crops, varying but slightly from year to year. However, a few crops have undergone wide fluctuations. The corn acreage took a decided upward trend beginning in 1918 and reaching the peak in 1924, after which it dropped slightly and has been quite constant during the past five years. The cucumber acreage has had rather extreme fluctuations due largely to the uncertain demands for such seeds from year to year.

The bean acreage was quite high in 1917 but on account of diseases and low market prices following the World War the acreage was very greatly reduced and reached the low point in 1921. Since that time the acreage has gained somewhat.

The tomato acreage has had a general growth since 1917 due to the expansion of the canning industry. The low acreage in 1921 was on account of an enormous carry over of canned tomatoes from previous years, and the factories were not in operation during that year.

The trend of agriculture in this section of the valley is toward more intensive crop production. The production of special crops which require intensive culture is generally centered in Otero County, and gradually spreads up and down the valley into the other counties. Pueblo County, of course, has an area near the city of Pueblo where intensive truck growing is carried on.

Rotations Followed

The early settlers in this district were not so much concerned with the matter of proper rotations of crops. There were other limiting factors in connection with crop production which at that time were of greater importance. The matter of getting sufficient irrigation water was the first consideration; proper cultural methods also had to be learned. When the cantaloupe industry grew into prominence, cantaloupes were often planted on the same fields a number of years in succession with no apparent bad results. When the sugar beet industry became established many fields were planted to sugar beets several years in succession and good yields of beets were consistently produced. Up to within the last decade it was not uncommon to find fields which had been in alfalfa for from 25 to 30 years and still producing fairly good crops of hay.

The virgin soil in this valley was extremely fertile and when irrigation water was applied, crops responded exceedingly well. The soil conditions were quite sanitary and in the early history of farming plant diseases and insect pests had not gotten into this region, and the matter of producing crops was merely a matter of cultivation and irrigation.

In recent years, however, conditions in this valley have changed. By growing the same crops too many years the fertility of the soil has been depleted. It has brought

about unbalanced conditions in these fields and it has introduced plant diseases and insect pests to such an extent that crop rotations have become necessary in order to produce profitable yields.

In planning a crop rotation system we can divide the crops grown into several groups, each group having a different affect upon the soil, and from this plan a number of different rotation systems may be selected. This gives enough variety to meet the needs of the different types of farms, different sized farms, where located, and kinds of crops best adapted to the individual conditions.

Crop Groups

No. 1 - Legume hay or seed.

1. Alfalfa
2. Red clover
3. Sweet clover

No. 2 - Grains.

1. Wheat
2. Oats
3. Barley

No. 3 - Vine crops.

1. Cantaloupes
2. Honey dews
3. Watermelons
4. Cucumbers
5. Pumpkins and squash

No. 4 - Root crops.

1. Sugar beets
2. Onions
3. Carrots, celery, potatoes, etc.

No. 5 - Forage crops.

1. Corn
2. Kaffir, milo, etc.

No. 6 - Cultivated legumes.

1. Beans
2. Peas

A number of other crops are grown, but these can be fitted into the above mentioned groups.

Following are some of the standard crop rotations that have been put into practice in this section:

An 8-year rotation

- 1st year - Alfalfa seeded with spring grain
- 2nd " - Alfalfa hay
- 3rd " - Alfalfa hay
- 4th " - Alfalfa hay
- 5th " - Vine crops, corn, or miscellaneous crops
- 6th " - Sugar beets (should be manured)
- 7th " - Vine crops, grain or miscellaneous crops
- 8th " - Sugar beets (should be manured)

1st year second series - Grain seeded with alfalfa

A 5-year rotation

- 1st year - Spring grain seeded with red clover
- 2nd " - Red clover for seed
- 3rd " - Red clover for seed
- 4th " - Miscellaneous crops
- 5th " - Sugar beets (manured)

1st year second series - Spring grain seeded with red clover

Other rotations which meet the particular situations on certain farms have been followed with very good success.

The following 8-year systems have been used.

No. 1

1st year - Alfalfa seeded with grain as nurse
crop
2nd " - Alfalfa hay
3rd " - Alfalfa hay
4th " - Alfalfa hay
5th " - Cucumbers for seed
6th " - Sugar beets
7th " - Grain or corn
8th " - Cantaloupes

1st year second series - Alfalfa seeded with
grain

No. 2

First 4 years in alfalfa
5th year - Cantaloupes
6th " - Grain or corn
7th " - Cantaloupes
8th " - Beets or onions

1st year second series - Alfalfa seeded with
grain

While the above rotation is quite generally used it is not one of the best, because cantaloupes following alfalfa do not have the quality that they generally have following other crops such as corn or grain. The yield, however, is usually very good.

No. 3

First 4 years in alfalfa
5th year - Cucumbers
6th " - Onions
7th " - Cantaloupes
8th " - Beets

1st year second series - Alfalfa seeded with
grain

No. 4

First 4 years in alfalfa
5th year - Cantaloupes
6th " - Beans
7th " - Onions
8th " - Beets

1st year second series - Alfalfa seeded with
grain

Various other combinations of crops may be planned to make up a good rotation to meet the needs of the individual.

As a general rule alfalfa should be plowed under at the end of the fourth year, followed by either corn, cucumbers or cantaloupes, preferably corn or cucumbers, then follow with sugar beets, onions, tomatoes, or beans. Any of these can again be followed with cantaloupes or other vine crops in rotation. These can be followed again by sugar beets, or other row crops except vines. Alfalfa may be put in the ninth year and a similar rotation followed during the next 8-year period.

Some prefer a 10-year system in which case annual crops in rotation are grown over a period of 6 years before seeding it back into alfalfa. In some cases it may be advisable to use a 10-year system, leaving the alfalfa in for a period of 6 years and follow this with 4 years of annual crops, and seed back to alfalfa the eleventh year.

Since there are a large number of different crops grown in this section, it is possible to plan a number of good rotation systems that can be adapted to most any condition that might exist in any part of the district. This

also makes it possible to continue the production of cantaloupes in this section insofar as its effect upon the soil is concerned. Proper rotations will prolong the period of time that cantaloupes as well as any other crops may be produced with reasonable assurance of satisfactory yields.

U.S. DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE
WASHINGTON, D.C. 20250
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CHAPTER 6

FARM MANURES AND COMMERCIAL FERTILIZERS

In the early history of crop production in the Arkansas Valley very little attention was given to the matter of fertilization of the soil. Even after cantaloupes had come into prominence, it was some time before soil fertility became much of a problem. There was a supply of available plant food present in this virgin soil which gave wonderful production for a certain number of years. In recent years there has come a realization among the farmers that the fertility of the soil has a limit and it has now become necessary on most farms to resort to the application of either barnyard manures or commercial fertilizers if crop yields are to be kept up to standard.

In the manufacture of sugar a large amount of beet pulp and beet molasses was accumulated annually at the sugar factories at Rocky Ford, Swink, Las Animas and Lamar. These by-products are excellent stock feeds, and while some of this was taken back to the farms by the beet growers, yet a large percent was left at the factory. Stockyards were thus provided and either commission firms or the sugar companies fed out thousands of head of cattle on these beet by-products. Thus a large amount of manure accumulated at these factory yards. For a number of years the companies had to employ men and teams to haul this manure out of the yards in order to get it out of the way.

During the past few years this manure has been very much in demand and now there is not enough to supply the demand even where a charge of \$1.25 per ton is made for it. There is a constantly increasing demand for barnyard manure in all parts of the Arkansas Valley, but especially in the more intensive farming sections such as the sections where cantaloupes are most extensively grown.

Commercial fertilizers have also just recently come into use in this valley. During the past several years the Bureau of Soil Fertility, under the direction of Dr. Oswald Schreiner, has carried on some extensive commercial fertilizer tests in various sections of the valley, extending from Pueblo to the Kansas line. These tests have shown that almost invariably there is an increased yield of crops when the proper kind of commercial fertilizers are applied. Crops such as cantaloupes, sugar beets, tomatoes, potatoes, or nearly all other crops where roots, fruit or grains are demanded will respond best to acid phosphate. Although good results are generally obtained by use of a complete fertilizer such as 4-12-4, having 4 parts nitrogen, 12 parts phosphate and 4 parts potash.

Average applications of 200 pounds per acre of either 20 percent acid phosphate or of the complete fertilizer have given good results.

In some instances where intensive farming was carried on, an application of 10 tons of barnyard manure together

with 200 pounds of acid phosphate has given excellent results.

The Nitrate Problem

About 25 years ago Dr. William P. Headden, chemist of the Colorado Agricultural College, began some investigational work on Arkansas Valley soils. Complaints had come to him from the valley that certain crops did not have the quality they had in previous years. Dr. Headden found there was present in some of these soils an excess amount of nitrates, and in some cases it seriously affected crop production.

Later Dr. Walter G. Sackett, bacteriologist of the Colorado Agricultural College, found that these excess nitrates were brought about by a micro-organism. This organism, the Azotobactor, under certain conditions fixes the atmospheric nitrogen into soluble nitrates in the soil. According^{to} Doctors Headden and Sackett, the conditions favorable for the production of nitrates by the Azotobactor are an alkaline reacting soil, relatively high soil temperatures, high moisture and an abundant supply of air in the soil such as one finds in well cultivated fields.

In 1921 a soils laboratory was established at Rocky Ford and a thorough study of the nitrate problem was made by Justus Ward who was placed in charge of this work. The results of this investigation indicate that nearly all

soils during winter months are relatively low in soluble nitrates, ranging mostly below 500 pounds per acre in the top four inches of soil. As the season advances, soil temperatures rise, and when water is applied and the soil is cultivated there is a rapid increase in soluble nitrates in many fields. Cantaloupe fields are generally found to be excessively high in nitrates during the summer months. Summer fallow fields show the most excessive amounts of nitrates and as cantaloupes are planted in rows from 5 to 7 feet apart, a large portion of the field is fallowed during the early part of the summer when the plants are small and thus we have a correlation in the cultural methods and the high nitrate content.

Methods of control of excessive nitrates have been worked out in a general way. Proper crop rotations together with abundant organic matter in the soil and judicious irrigation and cultivation are methods that can be employed to keep the nitrates from doing serious damage to crops. It has been observed that when there is a proper balance of available plant food in the soil the ill effects of nitrates are generally held in check. This can be done by the application of acid phosphate.

B. FARM ORGANIZATION AND PRODUCTION COSTS

CHAPTER 7

GENERAL FARM SYSTEMS

There is a wide range in the general farming systems throughout the Arkansas Valley district in which cantaloupes are grown. Farming systems are governed by a number of factors such as size of farm, location, under what kind of ditch, distance from market, type of soil, personality of operator, and a number of others.

The farms range in size from less than 5 acres up to 1,000 acres or over. Near some of the towns, especially Pueblo, Rocky Ford, and Manzanola, the farms generally are quite small and there are many tracts of 5, 10, 15 and 20 acres. A few miles out from these towns the farms run generally from 80 to 160 acres in size. Occasionally we find a larger tract of several hundred acres in one unit. Cantaloupes are grown on farms of all sizes represented in the district.

As in most irrigated sections the determining factor in crop production is primarily that of sufficient irrigation water. Most farming systems in this valley are adjusted to meet the irrigation system under which the different farms are located. Under the more favorable irrigation ditches, intensive farming is carried on, while under those ditches where the water is not so plentiful more general farming systems, including more drouth resistant crops are resorted to. Cantaloupes, however, are

grown under all ditches in the district and under all the varied conditions found.

Irrigation water comes largely from the melting shows in the mountains. This usually comes down quite gradually during the summer season. When there is a liberal amount of snow in the upper valley there is usually a spring freshet which gives to the ditches an early run of water. Under such conditions spring plowing and other seedbed preparation work can be done readily. In most seasons there is but very little snow in the lowlands and the mountain snows do not melt until farming is well under way in the valley. Thus in some cases spring plowing is delayed. Generally, however, the seasons are such that most crops can be planted in good seedbeds at the proper time.

Irrigation ditches need considerable attention. Occasionally they need dredging out. Lateral ditches also need constant attention, and the field laterals are usually sledged out each spring with an implement known as a "Ditch A."

Usually several farms are served by one main lateral which is located on the upper side of these farms. Dividing boxes are so located in these laterals that each farm receives its proper share of water. A number of cross laterals are constructed on each farm so that shorter runs can be made and the fields do not become waterlogged by having the water run over them at too long periods of time.

Seedbed Preparation

Plowing is almost entirely done by the use of two-way plows. This is to avoid any dead furrows which would occur if a one-way plow were used. On most soils it is advisable to harrow or drag the soil immediately after spring plowing in order to keep the top from drying out too rapidly and becoming hard and cloddy. In case of fall plowing, it is usually left in the rough over winter and then worked down in the spring by discing and harrowing. In some cases where the soil is extremely hard and dry it is necessary to irrigate the field before it can be worked into a good seedbed.

In plowing up alfalfa it is usually "crowned", plowed shallow, about 4 or 5 inches in the fall. Then it is plowed again in the spring about 2 inches deeper. This is then followed with a disc and harrowed, and then leveled with a large plank level. This cuts down the bumps and fills in the hollows which allows the water to run more evenly over the field.

In former years flood irrigation was largely practiced. That is, a large head of water was run over the surface of the field in order to get it thoroughly soaked. This method has now been almost entirely superseded by the furrow method. Even before planting, furrows about 5 inches deep and from 18 to 24 inches apart are made and the water is run down the furrows. The soil between the furrows be-

comes wet from subbing. There is less danger of water logging and less crusting by use of the furrow system and the same amount of water will irrigate double the amount of land in the same length of time as compared with the old system of flooding.

Planting

Planting is usually done in the larger fields with a beet planter, using special plates for cantaloupe seed. These machines plant four rows of beets at a time in drills from 18 to 24 inches apart. In planting cantaloupes only the outside drills are used, thus planting two rows at a time from 5 to 6 feet apart. The seeds are planted about $1\frac{1}{4}$ to $1\frac{1}{2}$ inches deep and about 12 to 14 inches apart in the row. A ditching shovel is attached to the planter beside the drill shoe which makes a furrow for irrigation.

In some of the smaller fields often a single-row one-horse drill is used, but the manner of planting is the same. Here the furrows are usually made with a cultivator. In order to make the water flow more freely, and to prevent any clogging in the furrows on account of clods or trash, a sledding device is used; 8 by 6 runners are fastened to a frame with one of the edges down which is dragged down the furrows. In some cases a 6 by 6 block is fastened to the rear of the ditching shovel on the planter which answers the purpose very well.

Planting usually begins about the middle of April and extends into the latter part of May. The season and other conditions govern the time of planting to some extent.

Immediately after planting the field is irrigated in order to start germination. From one to three weeks later, depending upon conditions, they are again irrigated, and thereafter every two or three weeks until the vines have completely covered the ground.

Cultivation is usually done with a beet cultivator, or in some cases with an ordinary corn cultivator. All of the ground between the irrigation furrow and rows of cantaloupes is thoroughly cultivated three or four times during the season. In addition to cultivation, the fields are gone over with hoes and all weeds within the rows, that were not gotten by the cultivator, are hoed out. The fields are kept free from weeds throughout the season.

Observations were made on length of time from planting to maturity. The time it takes depends upon the variety as some are earlier maturing than others, also upon the time of planting. If planted early in the season, it will take a longer period of time to mature than if they were planted later in the season.

From Hales Best melons, planted April 28, 1927, the first ripe melons were picked August 20th, or 114 days from date of planting. Perfecto melons planted on the same date did not show any ripe melons until September 2nd. Almost

two weeks difference in length of time to mature these two varieties.

Hales Best melons planted May 8th had ripe melons on August 24th, or 108 days after planting. Another field, in 1928, where the first planting was hailed out and was re-planted on June 23rd, showed the first ripe melons on September 25th, or 94 days from date of planting.

It is common observation that the later plantings grow much quicker and thus mature in shorter length of time after planting. However, the reasonably early plantings usually give the best results.

In some instances where extra early melons are desired, certain methods are employed to bring this about. Fields having rather sandy soil and sloping to the south are best suited. The ground is fall or winter plowed and a seedbed made early in the spring. Cantaloupes are planted in hills early in April and as soon as they are up, they are covered with paper caps, known as "hot caps." These hot caps protect the plants from freezing and as soon as danger of frost is over, they are first raised up on one side, and in a few days are removed. By this method it is possible to get cantaloupes on the market much sooner than by the ordinary method. The extra cost in using the hot caps runs from \$20 to \$25 per acre.

The nature of the cantaloupe plant is to have two or three distinct settings of fruit. The first set is called

the crown set, and in most strains we find from two to five melons in the crown set. The melons in the crown set usually ripen within a week or ten days of each other. The second set usually begins to ripen about a week or ten days after the crown set starts, and runs about the same course. The third set follows in about the same general way, except there are more melons coming on which never mature.

In a thrifty field of cantaloupes, the vines grow quite rapidly after the fruit begins to set and soon cover the entire ground between the rows. Just before the crown set begins to ripen the vines are turned back out of the irrigation furrows and laid up on the ridges. They are then given another run of water which is usually the last. This keeps the vines and fruit growing vigorously and also aids in developing some of the later sets of melons.

CHAPTER 8

METHODS OF HARVESTING CANTALOUPE

Most cantaloupes that are grown for commercial purposes are harvested and packed by contract labor.

When the melons begin to ripen in the larger fields, roadways are generally made at certain intervals by laying the vines back from the space between two rows, to permit a team and wagon to be driven through.

Standard crates are placed along these driveways into which the pickers drop the melons after which they are hauled to the packing shed. In the Colorado district the packing is largely done at field sheds which are usually constructed of poles with a brush roof for shades.

Usually Mexican labor is employed to do the picking, but they are generally supervised by some one who understands the proper time that cantaloupes should be picked. The pickers carry a sack over their shoulder, and as they walk along the row, they hook a "T" stick under the stem of those cantaloupes that appear to be ripe. When cantaloupes are ripe they readily slip from the vine. They are then picked up and put into the sack. When the sack load becomes quite heavy it is emptied into one of the field crates along the driveway.

The picking at the beginning, or usually as long as the crown set lasts, is done about every two days. Melons must be picked just at the right stage and for distant ship-

ments are generally picked on what is known as the "half slip" or just before the melon is really ripe. If picked at this stage it is far enough advanced in maturity to cause it to ripen or "sugar up" after it is picked. If it is broken, or forced off the vine, it is too green to harvest and such melons will not sugar up, and consequently will not be fit to eat. One of the great difficulties in the cantaloupe industry is to get the melons picked at the proper time. Too often they are picked too soon and when such melons are placed on the market they seriously affect the price.

When the field crates are filled they are hauled to the packing shed where they are dumped into a sorting bin. Here they are sorted and packed into crates. The work at the shed is usually done by white labor, especially the packing, although some Mexicans are employed for such work. The packers are usually men who follow this kind of work through the various cantaloupe growing sections of the southwest, namely, the Imperial Valley, Salt River Valley, and Las Cruces districts before coming into the Arkansas Valley.

It requires considerable training and practice to be able to properly pack cantaloupes. They must be packed uniformly and to get a certain number of melons in each crate. It is necessary to pack them tight, but they must not have too much bulge in the crate.

There are two types of various sizes of crates used

for the different sizes and packs of cantaloupes, namely, standards and flats. These are as follows:

Standards	- 12 x 12 x 23 $\frac{1}{2}$	inches
Pony Standard	- 11 x 11 x 23 $\frac{1}{2}$	"
Jumbo Standard	- 13 x 13 x 23 $\frac{1}{2}$	"
Standard Flat	- 4 $\frac{1}{2}$ x 13 x 23 $\frac{1}{2}$	"
Pony Flat	- 4 x 12 x 23 $\frac{1}{2}$	"
Jumbo Flat	- 5 x 14 $\frac{1}{2}$ x 23 $\frac{1}{2}$	"

The standard crates will hold from 36 to 45 melons of standard size. The pony standards will hold from 45 to 54 melons of smaller size, called pony size. The jumbo standard will hold from 27 to 45 melons of a larger or jumbo size. Standard flats will hold from 12 to 15 melons standard size. Pony flats will hold from 12 to 18 melons pony size, and jumbo flats from 6 to 12 melons jumbo size.

In former years the standard size crate was most extensively used, but in late years the flats have come into more general use.

The cost of these crates ranges from 16 to 20 cents each for the standards, and from 9 to 15 cents each for the flats.

Contract prices for cantaloupe harvest work vary some from time to time, but are somewhat as follows: For picking, 10 to 12 cents per standard crate; shed work, making standard crates, \$1.75 per hundred, and for making flats, \$1.25 per hundred; for packing standards, 6 to 8 cents per crate; for packing flats, 4 to 5 cents each.

As soon as they have been crated they are loaded onto

a truck or wagon and hauled to the shipping shed where they are inspected, and if passed by the inspector, they are immediately loaded into refrigerator cars. The Santa Fe cars are all iced at La Junta, while the Missouri Pacific cars are iced at Pueblo. They are moved into the markets under standard refrigeration as quickly as possible.

Cantaloupe Inspection Service

The state cantaloupe inspection law provides that all cantaloupes shipped out of commercial districts in Colorado either by rail or by truck, must be inspected and passed on by the State Cantaloupe Inspector or his deputies.

CHAPTER 9

VARIETIES AND TYPES OF CANTALOUPE GROWN

The original Rocky Ford cantaloupe was known as the netted gem or Eden Gem variety. It was a round type, well covered with netting. The meat was green in color and very delicious and spicy. This melon was the forerunner of a large number of types and varieties that are grown in this district at the present time.

The following are the principal varieties and strains grown as shipping melons in this district:

<u>Variety</u>	<u>Type</u>	<u>Color of flesh</u>
Pollock 10-25	Round and solid netting	Salmon tint
Perfecto	Slightly oblong	Pink
Hales Best (H.B.)	Oblong, slightly ribbed	Pink
Netted Gem	Round, solid netting	Green
Hearts of Gold	Round, ribbed	Pink
Burrel Gem	Oblong, ribbed	Pink
Abbott's Pearl	Round, coarse netting	Pink

A number of special strains and selections have been developed from the above varieties by several local breeders in the Rocky Ford district. Among these are the following:

Superfecto - A selection of the Edwards Perfecto

Perfected Perfecto - A selection of the Edwards Perfecto

Eden Gem - A strain of the original green meated netted gem

Earl Watters - A green meat similar to Eden Gem

Pollock 25 - This was a forerunner of the 10-25

Other special strains which are often grown are Pollock Orange Flesh, Peerless Pearl, Imperial Gem, Netted Rock, Netted King, Improved Hoodoo, Breakfast Bell, etc.

Other melons grown and shipped, although not strictly classed as cantaloupes, are the honey dews, casabas, persian melons, and honey balls.

Beginning with the year 1918 when we began making observations of the melon industry, the predominating variety was the Pollock 10-25. This is a round melon with solid netting and produces a high yield of uniform type melons. It was very popular at that time, being somewhat resistant to rust, and was also easy to pack and made a nice appearance in the crate. Later this strain lost some of its resistance to rust and as the deeper colored flesh grew more in demand, other varieties have come into prominence. In the last few years the Hales Best and Perfecto types have taken preference in the sections on the south side of the Arkansas River. On the north side in the Ordway district the Burrel Gem, or Ordway pink meat as it is known there, is the leading variety grown.

The Hales Best is the earliest maturing variety and this factor is a point in its favor. It is a new melon and the size and type have not been definitely established. One of the objections to it has been that it is difficult

to pack, however, this feature is being gradually overcome through seed selection.

The Perfecto melon is somewhat later in maturity than the H. B. but so far it has been more uniform in size and type and is an excellent melon to pack. Both the Hales Best and the Perfecto have a deep pink colored meat and have a very appetizing appearance when cut. They carry well in shipping and sell well on the markets.

The Hearts of Gold is quite extensively grown and is a very good melon to ship. However, it has one bad fault in that the melons ripen too much at the same time.

The Burrel Gem is one of the best shippers and has a delicious, spicy flavor. It is very popular in some markets. It is a difficult melon to pack on account of its shape, and it has a tendency in wet weather to split open on the blossom end.

Nearly all of the various strains have some advantageous feature and meet the fancy of some people, but generally the three or four leading varieties have all the requirements necessary to satisfy the trade. A constant effort is being made to improve the cantaloupes and in so doing there is a tendency for entirely new types and varieties to be established and thus we have this confusion of too many different kinds of cantaloupes.

CHAPTER 10

PRODUCTION AND HARVESTING COSTS

There is a wide variation in the costs of producing and harvesting cantaloupes in the Arkansas Valley districts. Production costs range from \$35 per acre to as high as \$70 per acre in some individual cases. Harvesting costs range from less than \$30 to over \$100 per acre, depending largely upon the yield.

Detailed records have been kept by growers which indicate the different items of expense involved in the production of cantaloupes. One example of high production costs was on a field plowed out of alfalfa which had to be double plowed and required considerable working to get a satisfactory seedbed. This was also land of high rental value. The expense items per acre were as follows:

Rent	\$40.00
Plowing (double)	7.50
Discing	1.50
Harrowing	1.00
Leveling	.75
Seed	2.50
Planting	.50
Irrigating	2.00
Sledding	.50
Cultivating	2.00
Hoing	6.00
Turning vines	.50
Insect control	.75
Other expenses	<u>5.00</u>
Total expense	\$70.00

Another example of production costs on cheaper land and where operating expenses were less, is as follows:

Rent	\$15.00
Plowing	5.00
Harrowing	.50
Leveling	.50
Seed	2.00
Planting	.50
Irrigating	.50
Cultivating	1.25
Hoeing	3.50
Furrowing	.50
Other expenses	<u>2.50</u>
Total expenses	\$31.75

Records kept on average conditions show production costs per acre as follows:

Rent	\$30.00
Plowing	5.00
Harrowing	.50
Leveling	.50
Planting	.50
Seed	2.00
Ditching and sledding	1.00
Irrigating	.75
Cultivating	1.35
Hoeing	6.00
Turning vines	.30
Furrowing	.50
Other expenses and overhead	<u>5.00</u>
Total expenses	\$54.90

Harvesting costs per crate run quite uniform since this work is largely done by contract labor. On a basis of a standard crate the average cost is as follows:

Cost of crate	\$0.20
Picking	.11
Packing	.08
Hauling	<u>.03</u>

Total cost per crate	\$0.42
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The cost per acre of course depends upon the yield and this varies considerably in the different fields. Based on the average yield of 146 crates per acre, would bring the harvesting costs per acre to \$61.32. The total average cost of producing, harvesting, packing and delivering an acre of cantaloupes is therefore approximately \$116.23, or about 80 cents per standard crate.

CHAPTER 11

CANTALOUPE SEED PRODUCTION

The Rocky Ford district is noted for its extensive vine seed industry, especially the production and distribution of cucumber and cantaloupe seeds.

As the cantaloupe shipping industry had its inception at Rocky Ford and has back of it a unique history, so the vine seed industry also has a past which is exceedingly interesting. As was stated in the introduction, the first attempt at seed improvement of cantaloupes was made by George W. Swink in 1885. In the early years of cantaloupe growing, however, most of the growers purchased their seeds from eastern seed houses with very irregular and unsatisfactory results. The seed was often badly mixed and the resulting crop was of an undesirable type that would not crate well. This led to a general trend for farmers to produce their own seed. A number of growers were soon making selections and were gradually working toward a more uniform type of melon.

During this period the type sought after was a standard size melon, round, well netted and green meated. It was known as the Netted Gem type and was a very good shipper in those days and sold readily on the market.

Later when plant diseases began to appear in this district the Netted Gem variety seemed to be very susceptible

and many fields were seriously affected by diseases, chiefly rust.

Among the early seed growers beside George W. Swink were such men as J. E. Gauger, who later introduced the honey dew melon into this district, and A. P. Kouns, also a pioneer melon grower who has contributed a great deal to the industry. Both these men are still actively engaged in cantaloupe production in this valley. Others whose names might be mentioned were J. P. Pollock, W. B. Ebbert, O. J. Baxter, and a score of others, all of whom had something to do with the improvement of the Rocky Ford cantaloupe.

In 1893 Mr. P. K. Blinn, who was then in charge of the Rocky Ford branch of the State Experiment Station, began some work on cantaloupe seed breeding. Later Mr. Blinn obtained seeds from a large number of growers in the district and planted these on the station under identical conditions. He found that certain qualities existed in the strain he had gotten from Mr. Pollock, including resistance to rust. Further selections were made and this later developed into the 10-25 Pollock, or salmon tint variety. This melon besides being resistant to rust, was a high yielder of uniform type melons which were easy to pack and stood up well in shipping. It soon became very popular in all the cantaloupe producing districts of the southwest.

Another type was developed by Mr. D. V. Burrell, which is known as the Burrell Gem. It is an oblong melon with

rather pointed ends, has deep ribs and the meat is of a deep pink color. The cavity of this melon is triangular in shape and generally quite small. It is rather late in maturity, but is a good shipper and has a delicious, spicy flavor. It is sometimes called the Ordway Pink Meat as it is one of the leading varieties grown in the Ordway district.

Another variety was later developed by Mr. Joe Edwards, known as the Edwards Perfecto. This melon is slightly more oblong than the 10-25, was originally a green meated melon, later through selection it became a salmon tint, and recently has developed into various strains of pink meats. Special selections have been made of the Perfecto by various seed breeders in the district such as the Superfecto, ^{Perfected} / Perfecto and others.

The H. B. melon has come into favor in recent years. It was found growing in the Imperial Valley, but its origin is somewhat obscure. Mr. I. D. Hale, who was employed by C. H. Weaver and Company of Chicago to look after their western cantaloupe business, made the first selections from this melon in 1923, and thus it was given the name of Hale's Best, or H. B. The main virtue of this melon was its early maturity, however, it was a hardy plant, produced good flavored melons, and stood up well in shipping. At first it was an extremely awkward melon to pack. It was very irregular in size and shape, but as the shippers all strive to get

onto the markets as early as possible, the early maturity was the feature that brought this melon to the fore. The very next season^{after} Mr. Hale established this melon, nearly all the seed breeders at Rocky Ford in some way got some of this seed and in spite of its irregular size and shape it soon became very popular, especially in the Imperial Valley. Within a few short years the seed breeders of the Rocky Ford district did wonders with this melon. By "doubling up", that is, growing a seed crop in the Imperial Valley which would be harvested in May and then planting the seed from this crop at Rocky Ford the same season, they have in five years produced ten generations from which selections have been made and some strains of the H. B. melon at this time are producing excellent crops of average size uniform melons which are not difficult to pack and are gaining in popularity in all sections of the country. The prevailing type of this variety at present is a slightly oblong shaped melon having faint ribs, but well covered with netting between the ribs. It has a deep colored pink meat, very spicy in flavor and runs in size largely from standard to jumbo.

Extent of Industry

The production of cantaloupe seed for the entire United States is centered at Rocky Ford. The seed breeders here have made a specialty of this industry and as the seasons and climatic conditions in the Arkansas Valley are espec-

ially well suited for cantaloupe production, the general trade is depending upon this section as a reliable source of seed. Practically all of the seed planted in the Imperial Valley is produced in the Rocky Ford district. Likewise most of the growers in the Turlock, Phoenix, Yuma, and Las Cruces districts purchase their seeds from the Rocky Ford seedmen. Thousands of pounds in various sized lots are shipped annually to all parts of the United States where commercial cantaloupes are being produced. Thus the cantaloupe seed industry is a very important industry in this district.

The well established seed breeders make periodic visits to the large producing sections in order to keep posted on the trend of demand for certain kinds of seeds. This alone gives them opportunity to see the resultant crop produced from their seed in these sections and are therefore better able to make improvements in their selections.

Practically 1500 acres are devoted each year to the production of cantaloupe seeds in addition to about 500 acres of honey dews, honey balls, casabas, and other miscellaneous melons for seed.

Cantaloupe seeds are grown under several different arrangements. The wholesale seed dealers have them grown by farmers on contract at so much per pound. Those who have both a wholesale and retail business generally grow some acreage themselves and have additional acreage grown by

farmers on contract. The farmers who have developed a seed business generally grow most of the seed themselves, but a few sometimes contract an acreage to be grown by others.

Various degrees of supervision are given by the seedmen where the seed is being grown for them by others. Some are extremely careful in every detail and supervise all operations closely in order to insure a high grade product, while in some instances seed is produced in a rather careless fashion.

Some contracts are made on a ^uacre basis. Under this contract the dealer furnishes the seed and the grower agrees to produce the crop and take all necessary precautions to keep it free from mixtures and to give it the best possible growing conditions. When the crop is ready for market, it is turned over to the dealer who assumes all responsibility of harvesting, cutting, washing and drying of the seed himself. Other contracts are made at so much per pound. The dealer furnishes the stock seed to be planted and the grower agrees to produce the crop, including cutting, washing, and drying of the seed, and to deliver it to the seedhouse where it is recleaned and the grower is paid for the seed on a recleaned basis.

Methods of Harvesting

Cantaloupes for seed are given the same cultural methods as though grown for market, however, they are allowed

to ripen more fully before being picked. The fields are usually picked over twice. The first time the crown set, or all the mature No. 1 melons are picked and piled and the seed cut from these, and later another picking is made of the later maturing melons.

The seed is cut by hand, by use of a cutting device made by fastening a corn knife, or beet knife, under the seat of a bench with the sharp edge of the blade up. The operator seats himself near the pile of melons, picks them up one at a time, cuts each in half on the knife, scrapes out the seed by passing each half over the rounded end of the knife and the seeds drop into a bucket underneath. The cut melons are thrown back into piles after the seed has been scraped out. The seed is then dumped into barrels and allowed to stand a few days or until a slight fermentation has set in. This loosens the pulp from the seed and makes it more easily washed. The barrels are hauled to the washing device which is located on some irrigation lateral. This is merely a sluice box with screens so placed that the pulp can be separated from the seed. After washing the seed is spread out on trays to dry. These trays have wire screen bottoms, and they are set at an angle. The seed is stirred occasionally in order to hasten the drying and to prevent discoloring. After the seed is thoroughly dry, it is sacked and taken to the seed house to be recleaned and polished and made ready for distribution. Some of the seed

firms in shipping seed will seal the bags with a metal seal in order to insure the purchaser a high quality of unadulterated seed.

Yields of Seeds

There is considerable variation in the amount of seed produced per acre. The yield depends largely on the yield of melons per acre, but there are also other factors that cause some difference in seed yields. The degree of culling is a large factor. Some growers harvest nearly all the well shaped melons produced, while others cull them very closely. There is also some difference in the strain or variety grown. The average yield for all cantaloupes over a term of years is approximately 225 to 250 pounds of re-cleaned seed per acre.

Some abuses have found their way into the cantaloupe seed business. One of the most flagrant abuses is that of cutting seed from the cull melons that are left in the fields from which all the good melons have been shipped to market. While it is a violation of the State Seed Law, yet unscrupulous seed dealers sometimes buy up such fields after the shipping season for a few dollars per acre, and then cut the seed from all the melons that were left in the field. Since it is impossible to tell by the appearance of the seed what kind of melons they were cut from, this cull seed often comes into competition with some of

the good seed produced and this often causes considerable trouble.

Cost of Producing Cantaloupe Seeds

Since the crop grown for seed is produced by the same cultural methods as if grown for market, the cost of production is essentially the same, averaging approximately \$55 per acre including all costs up to harvest time. Harvesting of seed usually begins about the first week in September, or at a time when the crown set melons are mostly matured. The contract price of cantaloupe seeds grown for the wholesale seed dealers varies somewhat from year to year according to the supply and demand of these seeds. The price generally ranges from 25 to 35 cents per pound for field run of seed where culls and immature melons are eliminated. The average price over a term of years is approximately 30 cents per pound delivered on a recleaned basis and must test 85 percent or better in germination. Seed dealers who endeavor to supply higher quality seeds generally pay a premium over the wholesale contract price. The amount paid varies according to the degree of perfection of the strain, the degree of care exercised in its production, the locality in which it is produced and also the ability and reliability of the grower. In some cases 40 or 50 cents per pound or even more is paid for the production of certain kinds of cantaloupe seeds.

In cases where the seed is grown on contract by the acre and where the seed dealer takes it over at harvest time, prices paid the grower have ranged from \$60 to as high as \$125 per acre. The price paid generally depends upon a number of factors, but chiefly on the productivity of the soil, and upon the ability and reliability of the grower.

Harvesting costs vary considerably as there is a wide range in methods employed, and in the care exercised in the various operations. Picking and piling costs range from \$3.50 to \$4.50 per acre, while cutting, washing, and drying ranges from \$8 to \$12 per acre.

One of the large seed dealers gives the following costs per pound as being average over a long term of years.

Picking and piling	2.0	cents
Cutting	3.5	"
Washing	.5	"
Drying	.5	"
Cost of equipment	<u>1.0</u>	"
Total cost per pound	7.5	"

The cost of equipment is figured as follows: The washing device costs \$15 to construct, including material, and it will last over a period of 5 years, making the annual cost \$3 per year. It costs \$3 per year to set up the washing equipment. Drying trays cost \$2 per tray to construct, including material. It takes 2 trays per acre and these last 2 years.

On an acre basis the cost of equipment per year is as follows:

Trays	\$1.00
Washer	.60
Cutting benches	<u>.40</u>
Total, per acre	\$2.00

Or, on a per pound basis, approximately 1 cent per pound. At a cost of $7\frac{1}{2}$ cents per pound on a yield of 250 pounds per acre makes the total harvesting costs average \$18.75 per acre. Add to this the average production costs of \$55 per acre and it makes the total cost come to \$73.75 per acre to produce and harvest an average crop of cantaloupe seed.

Another large firm stated that it cost them an average of approximately 10 cents per pound for all harvesting operations, including picking, cutting, washing, drying and cleaning of the seed. This added to the production costs makes the total cost on a 250 pound yield come to \$80 per acre.

Seed Dealers

At present there are nine wholesale and retail seed dealers located in Rocky Ford who grow and handle various kinds of cantaloupe and other vine seeds. Also a number of farmers in the near vicinity of Rocky Ford have developed quite an extensive cantaloupe seed business.

Dealers in Rocky Ford handling cantaloupe seed are as follows:

D. V. Burrell Seed Company
 Garwood and Woodside
 Ebbert Seed Company
 Jerome B. Rice Seed Company
 Western Seed and Irrigation Company
 J. C. Robinson Seed Company
 Jerre Cover
 R. H. James
 Blotz-Henneman Seed Company

The Ryan Brothers and P. K. Blinn, known as the Rocky Ford Cantaloupe Seed Breeders Association, handle a large volume of seeds. Will Morrison, seed grower, also has developed quite an extensive cantaloupe seed business. There are a number of other growers who grow various amounts of seeds for certain distant customers.

A total of from three to four/^{hundred}thousand pounds of cantaloupe seeds are distributed by the Rocky Ford seedsmen each year in addition to the enormous volume of cucumber, squash and other field and garden seeds handled by these firms.

CHAPTER 12

FACTORS TO BE CONSIDERED IN REDUCING PRODUCTION COSTS

While cantaloupes lend themselves to be grown in most sections of the Arkansas Valley of Colorado, there are some factors that must be considered in keeping down or reducing the production costs. Generally the trend is not for a reduction in costs of production, but rather toward increased costs with the purpose of producing better quality. The matter of quality is of prime importance. Often melons are shipped, which, on account of poor quality, do not bring enough on the market to pay the freight and other shipping costs. The greater the yield of such melons in such cases, the greater would be the loss, so the first consideration must be quality in order to create a demand that will pay sufficient to make a profit.

One of the chief factors to consider in production costs is the matter of high land values. Cantaloupes can be grown under a wide range of conditions and often some of the best crops are produced on the cheaper lands. Those having excessively high valued land cannot always compete in the production of this crop.

The matter of forcing cantaloupes entails an added expense which must be considered. In case of our local shipments the later melons often bring a better price than the early ones. On a limited acreage to supply nearby

markets, the expense in forcing for early melons may justify, and be more than offset by the better prices obtained for early melons.

The matter of combatting insect pests often necessitates a heavy expense which may cost more than can be realized from the resulting crop saved. Generally, however, it behooves the grower to save his crop if possible, unless the situation seems entirely hopeless. Plant disease control often causes an added outlay of expense and generally in case of a serious infection the yield and quality is reduced, thus making the cost per unit much greater. The benefits from control measures may not always be sufficient to justify the expense.

In both insect infestations and plant disease outbreaks, there is a tendency generally to wait until a large amount of damage has been done and then control methods are much more difficult and results usually less beneficial. The expense involved in control measures under such instances is generally not justified.

The matter of reducing costs of cultural practices is rather uncertain inasmuch as cultural practices have been more or less standardized. Costs of cultural practices are not much out of line with the cultural practices employed in the production of other crops in this district. Harvesting methods likewise are more or less standardized and the costs of harvesting operations may not be very gener-

ally reduced under present methods employed.

The apparent main object of the average intelligent grower in this district is to grow a conservative acreage of cantaloupes in his rotation, and to keep the production and harvesting costs down to the minimum, but to give the crop the care and attention necessary to produce a high quality product.

C. MARKETING CANTALoupES .

While there are a multitude of problems involved in the production of cantaloupes, there are also as many and perhaps even more intricate difficulties to overcome in the marketing of this delicate and highly perishable product.

CHAPTER 13

PROBLEMS AT MARKET

The average person perhaps does not realize that there are many problems involved in the jobbing, wholesaling, distributing and retailing of cantaloupes in the market centers.

Visits were made to the markets at Washington, New York, Boston, Buffalo, Detroit, Chicago, Louisville, St. Louis and Kansas City, and interviews had with various men connected with the large distributing firms, with federal inspectors, market news reporters, retailers, and fruit stand operators.

In New York City interview was obtained with the manager of Federated Fruit Growers, Inc., who told of competition, of methods in distribution, sales methods and volume handled.

On that day, June 22, there were $38\frac{1}{2}$ cars of cantaloupes sold in New York; 13 were sold at private auction; $7\frac{1}{2}$ at public auction; and 18 were sold on the street. The public auction is held each night at 2 a. m. and just enough cars are sold to establish a price. Some of the large distributors are opposed to the public auction as it tends to keep them from raising the price above what the market would justify. The auction however has solved some of the market abuses. Mr. Maerker says the jobber and consumer are two opposing forces in the matter of quality of cantaloupes. The jobber wants them firm even though they are green, while

the consumer wants them ripe and sweet.

Mr. Hackeleman, federal inspector, told of the problems in cantaloupe distribution in New York City.

The inspection department is not called upon to inspect very many Colorado cantaloupes. About 15 cars per season are inspected and these come mostly at the end of the season on Burrell Gems that are immature or held too long and are bad flavored melons. He told of his own experience in buying melons for home use. If he can get good melons he will buy a good many, but after a few purchases of bad melons he turns his attention to some other fruit. He suggests that shippers should allow melons to get more mature as the consumer wants them sweet and well sugared. The jobber, of course, wants them firm whether they have sugar or not. He doesn't eat them so is not interested in that factor except insofar as it will make business. He does not want over-ripe because they may get too soft and then he may have to dump them. A green melon can be sold even if it isn't fit to eat. In case of the green melon the consumer pays the bill and it is his loss, the distributor having passed it on and gotten his commission. Over one thousand people in New York each day will get green melons, and then they will substitute something else the next time.

A large fruit stand operator was interviewed in New York. This stand did a big volume of business and sold a

large number of cantaloupes. The operator stated that he liked the flat crate instead of the standard as the melons in the center of the standard crates sometimes become moldy. Also there is too much pressure on them and they become bruised. He likes the melons to be wrapped in paper which makes them look more attractive and he can sell them better. "People buy looks." He does not want over-ripe melons. He wants them firm, even though they are not well sugared, because he can sell the melons if they are firm but if they are soft he may have to dump them.

A retail operator was interviewed. He stated that he preferred the flat crate to the standard because he can sell flats to certain customers where he cannot sell standards. He prefers them to be unwrapped so the customer can see what he is buying. He wants them ripe but not soft, because he wants to satisfy his customers.

Boston is somewhat erratic as a market for western cantaloupes. The weather conditions here have a great deal to do with the consumption of cantaloupes. Also peaches, grapes, pears, citrus fruits, bananas, pineapples, and other fruits come in competition and sometimes cause cantaloupes to move rather slowly.

One of the distributors at Boston stated that at times they have considerable trouble with over-ripe and soft melons and they often have heavy losses. In order to turn them they must be firm. A number of fruit stand operators

in Boston all seemed to be of the same opinion that at times they have had heavy losses on account of soft melons. Some stated that melons reached them in soft condition while some admitted that in times of over-supply they could not turn them quickly enough and melons became soft while in their hands. Some preferred the melons wrapped, while others preferred them unwrapped.

Buffalo is a fairly good market for a limited supply of cantaloupes, but here too the weather often has a depressing effect on cantaloupe consumption. When it gets cold and wet the people turn their attention to other fruits.

The G. B. Woods distributors handle quite a large volume. The manager stated that their great trouble was that melons were often too green. They want them ripe but firm. They also want them unwrapped because they often find wrapped melons getting moldy. This firm caters to a high class trade and wants good quality in order to satisfy their customers. Buffalo trade has gotten educated to jumbos and are paying a premium of 50 cents per crate on them. The manager suggest that growers hold off picking a few days at start of season as it is generally the first few cars of green melons that break the market and then it is hard to recover.

One operator of a fruit stand stated that he would rather have melons wrapped, that they sell better on ac-

count of the appearance. He also wants them firm even if they are somewhat green rather than get them over-ripe. His object is to turn them.

A jobber stated that usually the early shipments will sell readily, but when customers get a few green ones they quit buying and then the jobber has a hard time getting rid of them. If he has a large supply on hand he knows some of them will have to be dumped, so in order to clean up he offers them at a very low price and takes his loss. This in turn lowers the price to all. He suggests that early shipments be allowed to mature a little better and then later in the season pick a little closer in order to keep them coming in firm, but ripe. A large percent of the late shipments should never be sent to market. Much of it is immature, "rubbery", poor quality stuff and generally does not bring enough to pay the freight from Rocky Ford. It costs about \$1.35 per standard crate to lay them down at his shed in Buffalo.

Chain stores sometimes have losses on over-ripes. They are hauled to some distributing point and from there they go to the various stores. It usually takes a day longer to get them into the hands of the consumers.

At Detroit we found practically the same situation as at Buffalo.

At Chicago we found the market glutted and there was

a heavy carry over from the previous day. Many lots on the platforms at the Racine Avenue markets were showing signs of deterioration. Chicago is a market that can easily be glutted. Many shipments are billed to Chicago with the idea of diverting them to other markets, but some of these are not diverted. Shipments on the Santa Fe railroad are frequently billed to Cornwith Station at Chicago and diverted to various markets from there.

Jobbers and retailers in Chicago expressed their views similar to those at New York, Boston, Buffalo and other markets. Some complained that the melons were generally shipped too green, while others had no objections to green melons, but they seriously objected to them being soft.

There was also a divided opinion at Chicago regarding wrapped melons.

The markets at Kansas City, St. Louis, Louisville, and Washington in general revealed practically the same situations as those described.

We find two classes of jobbers and retailers. One class endeavors to do a high class business and caters to high class trade. This class wants to satisfy the consumer and wants melons to be of good quality, ripe but firm, and wants them unwrapped so that the customer can see the product.

The other class will buy anything that can be sold at a profit. This class wants the melons to be firm even

though they are green, also prefers to have them wrapped as this adds to their appearance and may cover up a multitude of defects.

CHAPTER 14

MARKETING SYSTEMS

Various marketing systems have been in effect since the production of cantaloupes first became an industry in this valley. The melons shipped during the first several years were small lots sent by express or local freight to nearby cities, and were generally consigned to the dealers in these cities. When carlot shipments began they were also consigned to commission firms in markets such as Denver, Kansas City and St. Louis. The firms receiving these consignments would sell the melons for the shippers at whatever price they could get and charged a commission of a certain percent on the gross sales. The higher the price at which the melons were sold the greater would be the amount of commission received by the firm. Thus it was to the commission company's advantage to sell at as good a price as it was possible to obtain.

In 1896 a marketing association was formed at Rocky Ford which made a deal with the Western Poultry and Game Company at St. Louis. The latter organization agreed to handle the melons and pay the farmers 75 cents per standard crate. The following year the same company agreed to take all the melons grown by the Association at $97\frac{1}{2}$ cents per crate. An excessive overproduction that year caused the Western Poultry and Game Company to go broke. The farmers

got nothing for their melons and the railroad company had to cancel the freight bills. Since that time most of the commission companies have handled cantaloupes only on a consignment basis at a certain percent commission on the gross sales, or on contract with the growers on a commission basis of a certain percent on the gross sales.

Recent Marketing Systems

1. Contract with distributing firms on commission basis.
2. Independent grower consigning to commission companies or distributors.
3. Cash sales, F. O. B. shipping point.
4. F. O. B. auction company sales.
5. Contract with distributor on acre basis.
6. Cooperative marketing associations.
7. Express shipments.
8. Truck trade.

Approximately 70 percent of the acreage grown in the Arkansas Valley is grown on contract for distributing firms on a percent on gross sales commission basis. This system now includes what is known as advance payments, where, according to terms of the contract, the distributor agrees to pay the grower a certain sum per crate at the close of each week's delivery of cantaloupes. A system of pooling has also been developed whereby the total shipments over a given period of time, or for the season, constitutes a

pool. The returns are averaged for the period of the pool and prorated on the various shipments made. The advance payments may vary some, depending upon the distributor and upon conditions in general, but in recent years the advance price per crate has been quite constant.

There are a number of distributing firms who have handled melons from this district for a long term of years. The reliable distributors are the "backbone" of the cantaloupe industry in this district at the present time. Distributors operating on contracts in 1925 were as follows:

S. A. Gerard and Company
 American Fruit Growers, Inc.
 John Amicon Company
 Steinhart and Kelley
 Stanley Fruit Company
 Hannagan Bros.
 C. H. Weaver and Company
 Fruit Supply Company

Following is a list of distributors operating in 1929 with approximate acreages contracted:

	<u>Acres</u>
S. A. Gerard and Company	2,800
American Fruit Growers, Inc.	600
Van Bokolen Company	1,200
Fruit Supply Company	400
Stanley Fruit Company	600
Hannagan Bros.	600

The S. A. Gerard Company and the American Fruit Growers are two of the largest cantaloupe distributing firms in the United States. These two companies have operated in the Rocky Ford district for a long term of years. They also operate on an immense scale in the Imperial Valley,

the Turlock section, the Phoenix and Las Cruces districts.

At times during the past a large number of temporary distributors have come into this district who would operate one or two seasons, and in many instances the growers who have dealt with these "fly by night" concerns have had some sad experiences.

CHAPTER 15

CONTRACTS

Methods of Contracting Melons

The distributing companies usually have local representatives stationed in the district. These representatives solicit the acreage early in the spring and make contracts with the growers. They also service the growers throughout the season by giving suggestions on insect control, plant disease control, and in many other ways assist the growers who have contracts with them in bringing this crop up to maturity.

The following is an example of a typical cantaloupe contract written in this district by the distributors:

Agreement

THIS AGREEMENT, made and entered into in duplicate this _____ day of _____ 19____, by and between the undersigned individual growers of _____

County of _____, State of Colorado, parties of the first part hereinafter referred to as GROWERS, and party of the second part, hereinafter referred to as DISTRIBUTOR.

WITNESSETH: That for and in consideration of One Dollar (\$1.00), paid to each individual whose name is signed to this agreement (said individual being hereafter referred to as Growers), receipt of which is hereby acknowledged, and for other good and valuable considerations hereinafter mentioned, the Growers hereby appoint, accept, and constitute the above mentioned Distributor their exclusive marketing, selling, and distributing agent for all cantaloupes grown, owned or controlled by said Growers, for and during the season of _____, and agree to pay to said Distributor, as compensation for such services, a commission of fifteen percent (15%) of the amount received from the gross sales

of all cantaloupes delivered to and accepted for shipment by the Distributor; it being understood that all expenses for freight, refrigeration, demurrage, cartage, and all other proper and reasonable expense of marketing (excepting brokerage and commission at the destination) shall be borne by the Growers.

The Growers agree to plant or have planted the number of acres of cantaloupes as set opposite their respective signatures, said cantaloupes to be of the varieties known as _____

and the Growers agree to plant only such seed as is furnished by, or recommended by the Distributor. The Growers further agree to deliver to the shipping sheds or points of shipment designated by the Distributor, in properly matured condition, all cantaloupes of merchantable quality packed in crates as follows: _____

Each and every crate to contain cantaloupes of uniform size and quality. The Growers further agree to use their best efforts to produce the best possible quality cantaloupes and as early in the season as possible; to pick, handle and pack the same carefully, using due care to prevent injury from any cause; to furnish sorters at the packing bins, and sort and grade all cantaloupes before packing; and to pack the same uniformly, and according to instructions of the Distributor or its inspectors; to deliver said cantaloupes to the shipping stations of the Distributor on wagons equipped with springs under the body to prevent bruising, or if possible on auto trucks; cantaloupes at all times after picking to be protected from the hot rays of sun, dust, and rain, and the Growers hereby agree that cantaloupes not grading as merchantable are not to be offered for shipment. Further, the Growers hereby agree to abide by all State and Federal laws governing and applying to the grading, packing and shipping of cantaloupes.

The Distributor agrees to provide and sell to the Growers the following supplies at prices named, to-wit:

All crates to be complete, including the registered label bearing the brand of the Distributor, and it is understood

by the parties hereto that the use of said brand is loaned to the Growers and in consideration whereof the Growers agree that crates bearing said label and brand of the Distributor shall be used only for such shipments of cantaloupes as are made through the above mentioned Distributor. And it is further agreed that the Distributor shall not be liable to the Growers for failure to furnish such crates, or other materials, if prevented from doing so by strikes, fires or other causes beyond the control of the Distributor; and the Growers hereby agree to buy from the Distributor all such material and crates herein listed at the terms mentioned that are required for the packing of their cantaloupes, except in such cases where the Growers desire to furnish their own material and crates and have given the Distributor notice of such intention at the time of signing this agreement. It is specifically understood that title to all materials and crates so sold, or furnished by the Distributor to the Growers, shall remain in the Distributor's possession until fully paid for by the Growers.

Second. To make the following advances on account to the Growers:

Delivered to, accepted and shipped by the Distributor. Payment of said advances to be made to the Growers by the Distributor every Monday for all such amounts due for deliveries made during the previous week. It being understood and agreed by the parties hereto that the Distributor is to deduct from the above mentioned advances all amounts due the Distributor for any and all seed, material, crates, and supplies furnished the Growers by the Distributor.

Third. To furnish the necessary lumber to load and ventilate the cars, also inspectors to inspect, and laborers to load into cars all accepted crates of cantaloupes at the expense of the Distributor.

Fourth. To furnish the railroad company whatever guarantees shall be necessary for the freight and refrigeration charges in order to insure shipment for the account of the Growers, except in cases of strikes, embargoes, or car, or ice shortages, in which event the Growers agree not to offer cantaloupes for shipment if so requested by the Distributor.

Fifth. The Distributor agrees to use its best judgment and efforts in the marketing of said cantaloupes in order

to procure the best results, and the Distributor is hereby authorized by the Growers to create a pooling arrangement whereby all shipments of cantaloupes made by the Distributor shall be pooled each three days. The net results realized from the sales of said cantaloupes in each pool are to be credited to the account of each Grower, according to the number of crates each Grower shipped, and a statement shall be furnished each Grower showing the number of crates and the average net prices realized for the different size crates in each pool in which said Grower is interested. And as soon as possible after the close of the shipping season, settlement is to be made for all monies due from the sales of said cantaloupes after deducting all advances made by the Distributor, and any balances due the Distributor by the Growers for materials, crates and supplies. It being understood by both parties hereto that the pooling arrangement herein provided is for the convenience of the Growers, and the advances made to the Growers according to paragraph two are to apply on account of the season's results and not on the separate pools. The term "net results" mentioned, is understood by both parties hereto to apply to the proceeds of the sales of the cantaloupes after deducting therefrom the fifteen percent (15%) commission of the Distributor, freight, refrigeration, demurrage, cartage, and such other proper expense of marketing, same as might be incurred. It being further understood that if at the close of the shipping season the total net returns realized from the shipments made by any of the Growers hereto fail to equal the amount of the cash advances made to such Grower, then said deficit shall be borne by the Distributor.

Sixth. The Distributor agrees to furnish the Growers with a copy of the account of sales, if so requested, of all cars of cantaloupes shipped under this agreement, such copies of account of sales to be given to such Grower as is appointed by the Association of Growers to receive the same.

It is mutually agreed between the parties hereto that the Distributor shall not be obliged to accept cantaloupes from the Growers between the hours of 7:30 P. M. and 8:00 A. M.

It is mutually agreed and understood by and between the parties hereto that in the event of an over-supply of cantaloupes, or if in the opinion of the Distributor the cantaloupes will not sell for enough to realize the amount of the cash advances mentioned in paragraph two, and the freight and refrigeration charges, the Distributor shall have the privilege, upon giving twenty-four hours notice,

which notice shall be given to the Growers either in writing or by posting at the shipping station of the Distributor, to reduce or discontinue the payments of advances mentioned in paragraph two, and in such event, it shall be optional with either party hereto to reduce or discontinue shipments until markets justify further shipments, and the payment of said advances. Furthermore, that the inspectors furnished by the Distributors shall have the right to refuse to accept any cantaloupes offered for shipment by the Growers that fail to meet the requirements as to quality, grade and pack established by said Distributor, and that said inspectors' decisions as to quality, grade and pack shall be final and binding upon both parties hereto, excepting in cases where over-ruled by State and Federal inspectors.

It is agreed by the parties hereto that the Growers hereby assign to the Distributor for the purpose of collection, all interest of every character which the Growers may have in any claim or claims against the transportation lines interested in the transportation of the cantaloupes shipped under this agreement, and the Distributor agrees to make diligent efforts in collecting such claims, and as soon as possible after the same are collected, to credit to the account of each Grower the amount of his portion of such claims collected, less fifteen percent, which may be retained by the Distributor, and less all costs incurred in collecting such claims.

Furthermore, it is mutually agreed by the parties hereto that one-half of all State and Federal inspection charges paid by the Distributor shall be deducted from the crate advances mentioned in paragraph second. It is further mutually agreed between the parties hereto that the Distributor shall not be required to assume any of the obligations herein contained if the fulfillment of the same is prevented by fires, labor troubles, legal processes or other causes beyond the control of the Distributor; or liable for error in judgment in the marketing and distributing of said cantaloupes. Furthermore, the Distributor gives no warranty, expressed or implied as to the purity, description, quality, productiveness or any other matter of the seed furnished the Growers.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals on the day and year first above written.

Growers	
By President	By Agent
By Secretary	

While the above form of contract contains all of the essentials found in practically all forms of contracts now in use there are slight variations in the way in which they are worded and there may be some variation in the terms, and other details to be filled into the blank spaces. Also some companies embody additional clauses on such matters as percent of each of the different types of melons to be grown by the farmer, or a clause covering the terms of financial aid to the growers by the distributor, etc.

The average stipulated advance price per crate in recent years has been as follows:

For standard crates containing 36 to 45 melons	-- 70¢
For pony crates containing 45 to 54 melons	----- 40¢
For jumbo crates containing 36 to 45 melons	----- 75¢
For standard flat crates containing 12 to 15 melons	----- 35 - 37½¢
For jumbo flat crates containing 9 to 12 melons	----- 35 - 37½¢
For pony flat crates containing 15 melons	----- 25¢

CHAPTER 16

CASH SALES

A certain percentage of the independent growers in this district sell their melons for cash. Those growers who do not contract with distributors or who are not members of the Cooperative Marketing Association, generally grow small acreages which they expect to sell for cash to buyers, or in some instances consign to brokers or commission firms in some of the markets.

The opportunity to sell for cash depends somewhat upon the general demand for cantaloupes or upon the general market situation. In seasons when the market demands are firm and the quality of melons is good, it is not difficult to dispose of them on a cash basis. However, in seasons when market conditions are not favorable cash buyers are not always at hand to purchase the melons from the growers.

Comparison of 1926 and 1927 Seasons

The year 1926, while there was a comparatively low market generally on cantaloupes in the larger markets, was nevertheless an exceptionally good season for the Arkansas Valley district.

Weather conditions were favorable, the quality of the melons was exceptionally good, and in spite of the general low market at the terminals, Colorado melons were in demand and sold at relatively good prices. The favorable market

conditions brought a number of cash buyers into the district who were eager to purchase the melons from independent growers at satisfactory prices throughout the season.

The 1927 season in its relation to the matter of cash sales was in direct contrast with the 1926 season.

The weather conditions in 1927 were very unfavorable. It was a wet harvest with considerable damage by hail and rust. The quality of the cantaloupes was extremely poor, and the demand was far below normal.

At the beginning of the season a number of cash buyers came into the district and purchased several cars. The market, however, was on a decline and these cash buyers lost heavily on their shipments. As the prospects were not very bright for immediate improvement in the markets these cash buyers quite abruptly quit doing business altogether and this left many of the independent growers without any method of disposing of their crop. As an example of how the season affects cash sales we refer to the experience of a Growers' Association.

In 1926 a small group of growers near Rocky Ford formed themselves into a marketing association whose purpose it was to sell cantaloupes collectively and only to cash buyers for cash on an F. O. B. shipping point basis. Since this was a good season and nearly all growers realized a profit, this association likewise, because it could sell readily to cash buyers was able to show a profit.

This established a certain degree of confidence in the Association and in 1927 they gained quite a good sized membership.

A few cash sales were made by this Association early in the 1927 season, but as the cash buyers had all quit before the volume had hardly commenced to come in, the Association was forced to consign most of their crop to brokers. As there had been no previous sales arrangements, and the markets were all dull, the Association soon found itself in a hopeless situation and lost heavily on the consigned shipments. This caused so much dissatisfaction among the members that the organization was discontinued.

The cash sales system generally is considered a very good method of marketing a limited volume of cantaloupes in this district, but there is a large element of uncertainty about it. It is difficult to sell for cash when there are no cash buyers, and as these buyers are under no obligations whatever to appear on the scene at harvest time, they are rather hard to depend upon.

In average seasons there are usually a number of cash buyers at hand and a limited acreage can as a general rule be disposed of in this way. It is a system that can best be used by those farmers who do not depend upon cantaloupes as their main cash crop, but who plant small acreages as a rotation crop. If the demand is good they can readily sell them for cash. If the demand is not good they will

not be at such great loss even though they cannot get much
for their cantaloupes.

CHAPTER 17

F. O. B. AUCTION SALES

The F. O. B. auction sales system was operating in this district during the 1924 and 1926 seasons, but since that time, for reasons that are somewhat shrouded in mystery, it has been discontinued.

The auction companies during these years were established in several of the large market centers. They had a representative at Rocky Ford who looked after the local business, including loading, and billing of the cars. Federal inspection was necessary for this method of selling cantaloupes. As soon as a car was loaded and inspected a certificate was written out by the inspector, stating the contents of the car, its quality and condition, etc. This information was then wired to the auction company office in one of the terminal markets. The car was then sold at public auction based on the Federal certificate, and paid for while it was still in transit. The money was then wired back to the local representative who would distribute the returns to the grower. The grower paid all freight and other shipping costs and paid a flat price per car for this sales service.

The F. O. B. auction sales gave very satisfactory service to the growers during the short time that they were operating in this district.

CHAPTER 18

COMMISSION CHARGES

Little comment is necessary regarding commission charges for handling cantaloupes by the distributors. The distributing system has been standardized to such degree that practically all distributors operating in this district have adopted a quite uniform type of contract which provides for 15 percent commission to the distributor on the gross sale returns received for all cantaloupes handled. For example, if a car of cantaloupes is shipped to New York and sold there by the distributor to some jobber at \$4.00 per crate, the distributor in making his returns to the grower will deduct 15 percent or 60 cents per crate in payment for his services in marketing the melons.

CHAPTER 19

SALES EXPENSE

The sales expense in marketing cantaloupes varies to quite a considerable extent, depending upon the sales system used by the distributos and upon the manner in which cantaloupes are moved according to supply and demand.

The items of expense of marketing wherein the grower is affected , for each dollar's expense, is prorated in the following percentages:

Freight	.4173
Tax and insurance	.0125
Cartage	.0107
Commissions	.1500
Other grower expense	<u>.4095</u>
Total	1.00

The amount of expenses, of course, would vary according to:

1. The distance the car is being shipped and the amount of the freight.
2. The amount of taxes and insurance involved, which varies.
3. The amount of cartage expense which also varies.
4. The amount of commission charges depending on the sale price.
5. The amount of overhead and other expenses involved.

The expenses involved in the sale of cantaloupes insofar as the distributor is affected has an extremely wide variation and depends upon a large number of factors, including the following:

1. Volume of business.
2. Efficiency of sales organization.
3. Demand for product.
4. Rate of movement.
5. Quality of product.
6. Method of disposal at terminal.
7. Ability to finance the enterprise.
8. Overhead expenses, and a number of other factors which may enter into the business.

A number of distributors operating in this district have their own receiving offices at a number of terminal markets to which all cars are consigned, or, in other words, they consign to themselves in these receiving markets.

The commission firms having these market contacts within their own organization are generally in better position to meet the difficulties that constantly arise in these markets and are therefore able to give better service to the growers in the marketing of the crop than those firms who merely consign to jobbers who are not connected with their organization.

To get a general idea of the total expense involved in marketing a carload of cantaloupes insofar as it affects the grower, we will take for example a car loaded and billed to a jobber at Chicago, taking average conditions and average yield.

Yield per acre, standard crates -	150
No. crates per car, standard ----	300
Average price per crate	
at Chicago -----	\$ 2.50
Average harvesting and loading	
costs per acre -- -----	50.00

On a carload basis the amounts are approximately as follows:

Harvesting and loading costs ----	\$100.00
Freight to Chicago -----	250.00
Icing charges -----	70.00
Insurance and tax -----	7.00
Cartage -----	6.00
Commission -----	<u>112.00</u>
 Total expense per car -----	 \$545.00
 Amount received @ \$2.50 per	
crate -----	\$750.00
 Net returns to grower in this	
case -----	\$205.00

D. TRANSPORTATION

CHAPTER 20

TRANSPORTATION PROBLEMS

The Arkansas Valley district is served by two railway systems: The Santa Fe railroad which serves the Arkansas Valley proper, handling all the rail shipments from a part of Pueblo County and all of Otero, Bent and Prowers counties; and the Missouri Pacific railroad which handles all of the rail shipments from Crowley County and a small volume from Pueblo County.

A relative comparison of shipments by these roads is shown in the following table which was taken from the Cantaloupe Inspector's reports.

Table VII

County	Number cars shipped	
	1925	1927
Otero	2,170	2,675
Bent	452	831
Prowers	---	26
Pueblo	114	41
Crowley	1,070	406

Transportation service is an extremely important factor in the cantaloupe industry. The transportation companies must get a very close estimate of the volume to be shipped and when it will be ready, a considerable length of time in advance, in order to have on hand a sufficient number of refrigerator cars at the time they are needed.

During the past 10 years the shipments by rail have

ranged from 2,115 to 5,108 cars, with an average of 3,312 cars per season over this period.

The following table shows the total carlot shipments per year over a 15-year period.

Table VIII

Year	No. cars	Year	No. cars
1914	2,809	1922	4,463
1915	795	1923	2,115
1916	1,740	1924	2,654
1917	1,898	1925	3,324
1918	1,818	1926	5,108
1919	3,132	1927	3,970
1920	2,454	1928	2,785
1921	3,215		

CHAPTER 21

FREIGHT RATES AND REFRIGERATION COSTS

Transportation costs are very important items in the cantaloupe industry. The chief markets are located in the industrial centers of the eastern states and the shipping charges to these centers are of considerable consequence.

The following figures are given as a comparison of freight rates from Rocky Ford to some of the important market centers.

Table IX

Market	1917		1920		1926	
	Freight	Refrig- eration	Freight	Refrig- eration	Freight	Refrig- eration
Boston	\$173.60	\$67.50	\$289.00	\$90.00	\$260.00	\$90.00
New York	165.60	65.00	276.00	85.00	248.00	85.00
Phila- delphia	161.60	65.00	268.00	85.00	242.00	85.00
Pittsburg	129.20	60.00	216.00	80.00	194.00	80.00
Cleveland	123.00	60.00	205.00	80.00	185.00	80.00
Cincinnati	113.60	60.00	200.00	80.00	170.00	80.00
Chicago	92.00	50.00	155.00	70.00	140.00	70.00
St. Louis	82.00	50.00	139.00	65.00	125.00	65.00
Kansas City	70.00	45.00	119.00	60.00	107.00	60.00

There was a considerable increase in freight rates from 1917 to 1920 but there has been a slight reduction since 1920.

The figures on freight rates for 1917 and 1920 were published in the Rocky Ford Tribune under date of March 4, 1921, and the 1926 rates were taken from the summary of

Market News Service for that season.

The following table shows the rate per standard crate and total carlot charge including refrigeration, from Rocky Ford to many of the larger cities.

Table X

From Rocky Ford to	Rate per standard crate	Total carlot charges
Atlanta, Ga.	\$1.08	\$320.00
Baltimore, Md.	1.12	330.00
Birmingham, Ala.	1.04	305.00
Boston, Mass.	1.19	350.00
Buffalo, N. Y.	.93	274.00
Charleston, w. Va.	.93	274.00
Chatanooga, Tenn.	.96	283.00
Chicago, Ill.	.71½	210.00
Cincinnati, O.	.85	250.00
Cleveland, O.	.90	265.00
Columbus, O.	.88½	260.00
Des Moines, Ia.	.63	185.00
Detroit, Mich.	.88	259.00
Houston, Tex.	.85½	251.00
Indianapolis, Ind.	.82	241.00
Kansas City, Mo.	.57	167.00
Little Rock, Ark.	.71½	210.00
Louisville, Ky.	.80	235.00
Memphis, Tenn.	.71½	210.00
Milwaukee, Wis.	.71½	210.00
Minneapolis, Minn.	.74	217.00
Newark, N. J.	1.10½	325.00
New Haven, Conn.	1.19	350.00
New Orleans, La.	.78½	231.00
New York, N. Y.	1.13	333.00
Omaha, Nebr.	.57	167.00
Philadelphia, Pa.	1.11	327.00
Pittsburg, Pa.	.93	274.00
Portland, Me.	1.19	350.00
Providence, R. I.	1.19	350.00
Richmond, Va.	1.10½	325.00
Springfield, Mass.	1.19	350.00
St. Louis, Mo.	.64½	190.00
Topeka, Kans.	.56	164.00

Table X continued.

From Rocky Ford to	Rate per standard crate	Total carlot charges
Tulsa, Okla.	\$.58½	\$172.00
Washington, D. C.	1.12½	331.00
Wheeling, W. Va.	.93	274.00
Wilmington, Del.	1.10½	325.00

The following table shows a comparison of freight rates and refrigeration charges per can on cantaloupes from Arkansas Valley points and the Phoenix and Imperial Valley districts. The rates and charges from Phoenix to eastern markets are the same as from the Imperial Valley.

Table XI

Market	From Arkansas Valley points		From Phoenix and Imperial Valley	
	Refrig- eration per car	Total frei- ght and re- frigeration	Refrig- eration per car	Total frei- ght and re- frigeration
Boston	\$90.00	\$350.00	\$145.00	\$544.00
New York	85.00	333.00	140.00	540.00
Pittsburg	80.00	274.00	135.00	530.00
Chicago	70.00	210.00	125.00	456.00
Kansas City	60.00	167.00	120.00	436.00

CHAPTER 23

EXPRESS AND TRUCK SHIPMENTS

The express shipment service is of considerable importance in the cantaloupe shipping industry. It is the chief method of shipping small lot shipments by rail, and to intermediate shipping points. Most growers ship some melons by express. The early maturing melons which are ready for shipment before carlot movements begin are largely shipped by express to various markets. Many of the full ripe, or choice melons which have ripened beyond the stage where they will stand long freight shipments, are often shipped to nearby markets by express. A number of growers have established a system of supplying special customers such as large hotels, mountain resorts, mining camps, etc., throughout the season, and these are mostly shipped by express.

Nearly all of the twenty-five shipping stations in the Arkansas Valley district ship more or less cantaloupes by express. Preferential express rates apply to crate shipments of cantaloupes from this district to most points where it is practical to ship by express. From the Rocky Ford station as high as 600 flat crates have been loaded onto one of the regular trains carrying express.

In recent years the American Railway Express Company has furnished refrigerator express cars, and a number of carlot express shipments have been made. When the demand

is good mature melons of high quality are being shipped, carlot express may be the most profitable method of shipping under such conditions as it gets the product to market in the quickest way possible and under ideal refrigeration.

Parcel Post Shipments

A very small percent of cantaloupes are shipped by parcel post. These are mostly shipped in the first and second zones for beyond that the rates are greater than express.

Shipments by Truck

Improved roads and the motor truck are playing an important part in the transportation of cantaloupes from this district. In late years a large volume of melons have been trucked to nearby markets, including Pueblo, Colorado Springs, Denver, Trinidad, and to other mountain towns, mining camps and resorts. Melons are also trucked to points in New Mexico, Kansas, Oklahoma and Texas.

The kind of melons the trucks take out of this district are somewhat varied. While some choice melons, well packed and of good quality are carried out by truck, yet quite frequently some very inferior melons have been disposed of by transporting them with trucks. Trucks are often loaded at the farm late in the evening and taken out of the district during the night, thus evading the inspectors. In this way many melons that were not fit to ship have been

marketed, although in violation of the State Cantaloupe Marketing Law.

CHAPTER 23

ROADSIDE MARKETING

Roadside marketing of cantaloupes has become quite a factor in recent years. Growers located on the Santa Fe trail or on the Kansas-Colorado boulevard often put up stands at the roadside and offer cantaloupes for sale to tourists and others travelling on these roads. There are two types of these sales stands; one catering to the truck trade dealing mostly in crated melons, while another type of stand caters largely to the tourist, handling both crated and loose melons. One of these roadside markets dealing with truckers during the 1928 season took in over \$2,000 for cantaloupes.

Another stand on the Santa Fe trail which sold mostly loose cantaloupes and other melons to tourists, over a six-weeks period, averaged a gross income of \$22 per day.

During the peak of the cantaloupe season from 75 to 100 roadside market stands are located along the Santa Fe trail in the district and a number are also located along the Kansas-Colorado boulevard, mostly in Crowley County.

CHAPTER 24

INSPECTION OF COLORADO CANTALOUPE

After the cantaloupe industry had become quite well established in the Rocky Ford district there developed a problem regarding the quality of melons that were being shipped to market. Some shippers insisted on packing and shipping green melons which were not fit for human consumption. This practice was indulged in to such an extent that the Rocky Ford cantaloupe was losing its good reputation in the eastern markets. In 1917 a law was passed by the State Legislature making it compulsory for shippers of cantaloupes to have them inspected by a duly authorized inspector who had authority to condemn any shipment or parts of shipments that were not of good quality and condition. The law has been amended from time to time to meet new situations which were constantly springing up.

In 1925 arrangements were made whereby the Federal Department of Inspection and Standardization of Fruits and Vegetables cooperated with the state cantaloupe inspector in the inspection of Colorado cantaloupes. Under this arrangement the state inspectors were given Federal licenses to write certificates on each carlot shipped out of the state. The inspection service is self-sustaining and fees under this act are \$4.00 per car, one-half of which is paid by the shipper and one-half by the grower.

During the 1929 shipping season one of the distributing

firms shipping from the Arkansas Valley refused to abide by the provisions of the cantaloupe inspection law, and it was carried into the courts. As a result of this action, the District Court granted the shipper an injunction against the state inspector, pending a decision by the Supreme Court on the constitutionality of the law. Under these circumstances the inspection service was discontinued for the time being and there is at present no restriction as to the kind and quality of melons that are being shipped out of the state.

The Federal inspection service, however, is still available, although optional with the shippers. Federal inspection does not prohibit the shipment of any products, but will issue a certificate on each car inspected showing the quality and condition of the stock at the shipping point.

CHAPTER 25

DEGREE OF MATURITY AFFECTS SHIPPING QUALITIES

During the summer of 1918 the United States Department of Agriculture carried on some investigations at Rocky Ford to determine the relative keeping qualities of cantaloupes picked at different stages of ripening. Cantaloupes were divided into three lots. Some lots were picked when the melons were fully matured and would slip freely off the vine. This is what is known as the "full slip." Some lots were picked on what is known as the "half slip" or at a stage when they are not fully matured, but far enough advanced so that they generally ripen and develop sugar and flavor after they are picked. Other lots were picked at a stage where they were quite well netted, but had to be forced off the vine. These were representative of a large number of melons which are being sent into the markets by some shippers every year. The crates were all marked and were followed through to consuming centers.

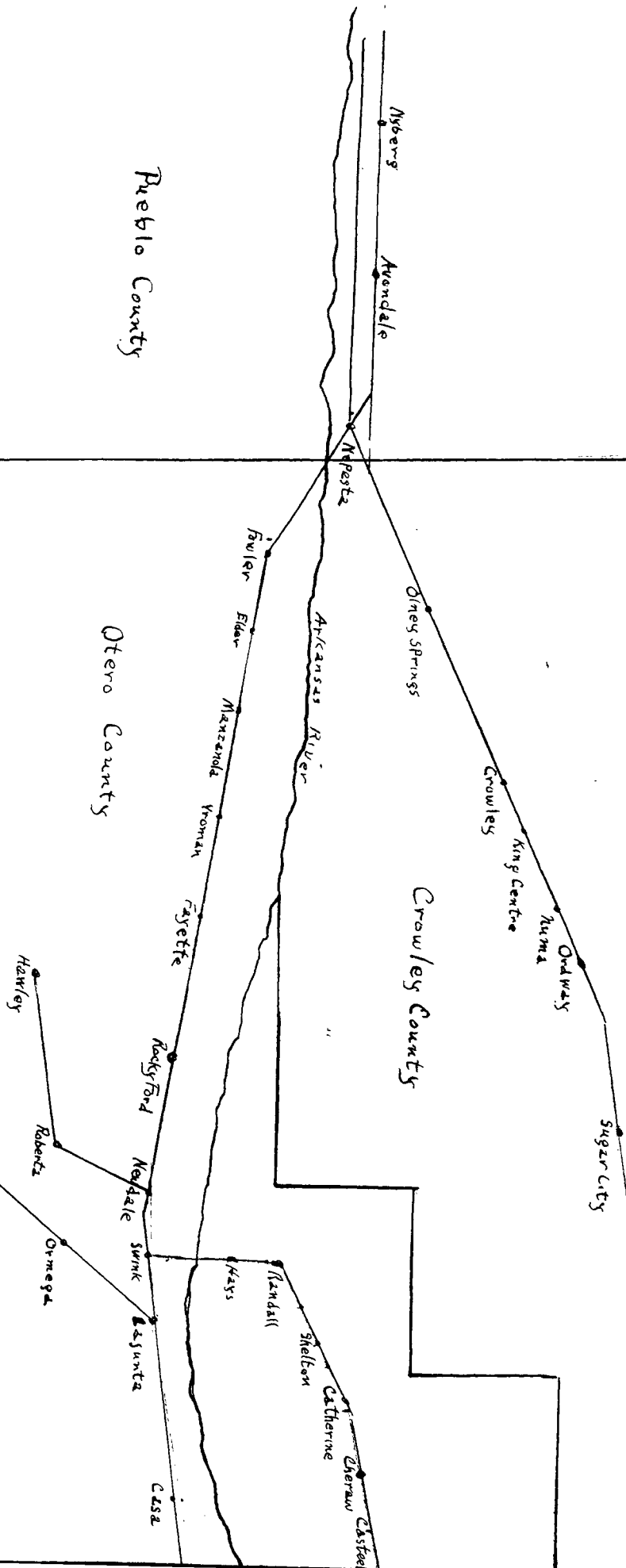
It was found in practically every case that the fully matured melons stood the shipping much better and were of better quality and condition a week to ten days after picking when they reached the final consumer than the other lots. Those picked on the half slip came next in quality and condition, while the immature melons were shrunken and of a very bad flavor.

These investigators also placed a number of crates of

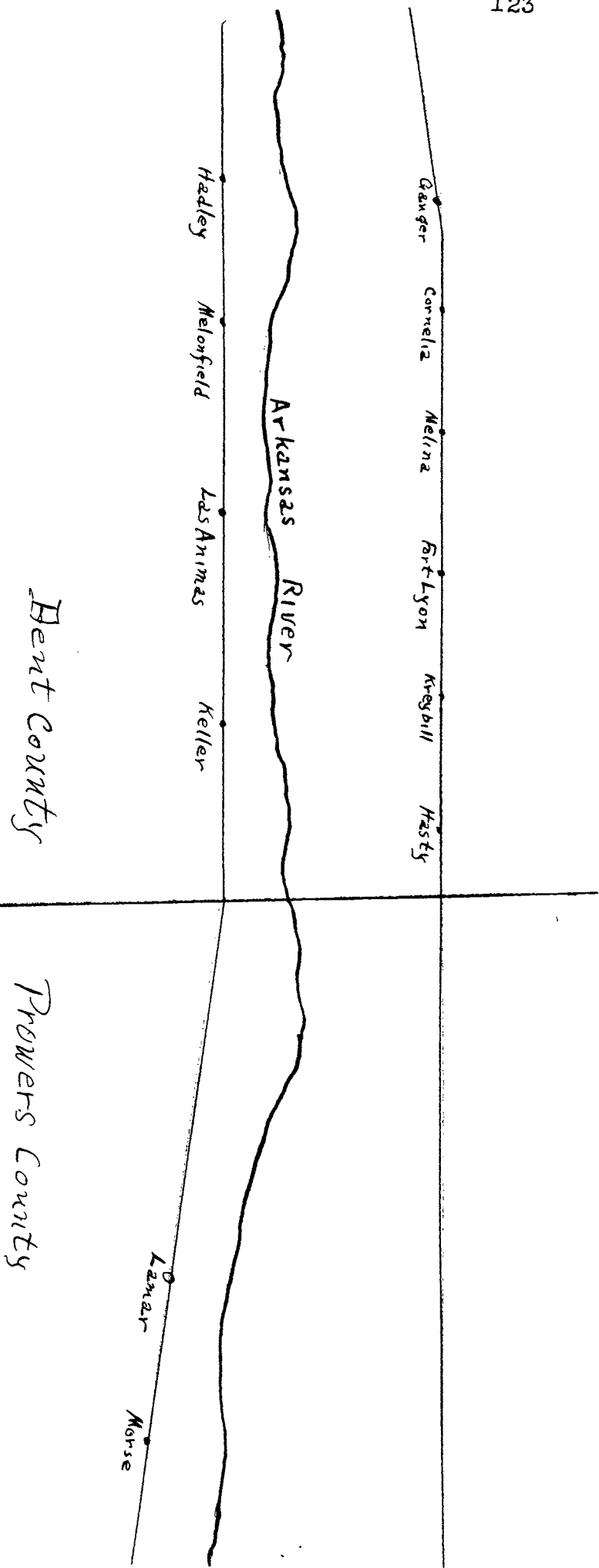
these classes of melons in cold storage at Rocky Ford. At the end of 10 days they were taken out and kept at room temperature for 24 hours after which they were cut and examined. Here again, the mature melons were of the best quality and in the best condition. They obtained practically the same results as on those shipped to market.

These tests have been corroborated many times by shippers. Generally, when immature melons are shipped to market, there is a decided drop in prices. People generally do not relish green cantaloupes.

Railway Loading Stations Pueblo, Crowley and Otero Counties



Railway Loading Stations
Bent and Prowers Counties



E. CANTALOUPE PRODUCTION IN CALIFORNIA
ARIZONA AND NEW MEXICO

A study of the cantaloupe industry was made in 1937 of the Imperial Valley and the Turlock districts of California, the Salt River or Phoenix district of Arizona, and the Messilla Valley near Las Cruces, New Mexico.

CHAPTER 26

CANTALOUPE PRODUCTION

Imperial Valley of California

The Imperial Valley is the most important cantaloupe producing section of the United States. About 30,000 to 40,000 acres are grown annually in this district, which is nearly one-third of the total production of the United States. There are some 200,000 acres in the valley that could be devoted to cantaloupe production. About 130,000 acres are now in alfalfa, and there is a large acreage of grain, corn, cotton, citrus fruits, grapes, lettuce and many other miscellaneous crops grown.

The Imperial Valley is favorably situated for cantaloupe production. It is watered by an irrigation system from the Colorado river and has an abundant supply for the early crops such as cantaloupes. The Colorado river is generally at flood stage during the time cantaloupes are in need of water.

There is a wide range in kind and quality of land in the Imperial Valley, but as production costs of cantaloupes are very high, only the best fields are planted to this crop. As most cantaloupe ground is leased, leases are made for three years, mostly for alfalfa ground which is plowed up and then intensively double cropped with about three crops of cantaloupes and three crops of lettuce, and then it should be put into alfalfa again in order to build up the

fertility. Rent on such land runs from \$35 to \$65 per acre per year on a 3-year basis for the three double crop years.

Taxes are very low in this valley and water tax is also quite low. Where the water is used the tax is from \$3 to \$4 per acre, and where it is not used the tax is \$5 per acre. This system of charging more for unused water is to discourage speculation in lands and to get more into cultivation and crops.

Ninety percent of the cantaloupes in the Imperial Valley is grown by commission firms. Many of these firms own considerable land which they farm and then lease an additional acreage.

In 1926 a total of 33,142 acres of cantaloupes and honey dews was grown and handled by 62 distributors who had acreages ranging from 70 acres to 2,481 acres. The largest acreage that year was handled by the American Fruit Growers, incorporated.

In 1927 a total of 37,727 acres was handled by 57 distributors with acreages ranging from 75 to 3,115 acres. The S. A. Gerard and Company had 3,115 acres which was the largest acreage handled during the 1927 season.

The following tables give the name of the company, their headquarters and the acreages grown by each for the years 1926 and 1927.

Table XII

Cantaloupe Acreages in the Imperial Valley, 1926

Name	Address	No. of acres
Alamo Packing Company	Heber	1,464
American Fruit Growers	Brawley	2,481
Amicon, John, Bro. & Co.	El Centro	800
Angeli Bros. & Luis, M. S.	El Centro	175
Arena, A. & Company	Brawley	1,189
Arkelian, B. H.	Heber	320
Arrow Packing Company	Heber	150
Asher, J. S.	Callexico	150
Bagnall, Charles	El Centro	400
Bright, Fred R.	El Centro	550
Begg, R. D.	Callexico	230
California Lettuce Growers	Heber	200
California Vegetable Union	Holtville	700
Cochrane & Hunter	Callexico	80
Combs & Freeman	Brawley	510
Crown Packing Company	El Centro	150
Eagle Packing Company	El Centro	110
Earl Fruit Company	Callexico	550
Farmers Produce Company	Brawley	850
Fawcett, W. S.	El Centro	650
Fites, H. P.	Callexico	140
Gallagher, S. J. & Company	Brawley	240
Gentile, Jos. Company	El Centro	1,100
Gerard, S. A. & Company	Brawley	2,043
Handy, J. W. & Company	Brawley	800
Holtville Packing Shed	Holtville	130
Imperial Produce Company	Brawley	650
Imperial Valley Growers' Ex.	El Centro	160
Independent Growers, Inc.	Brawley	345
Iwata, K. C.	Brawley	651
Jack Bros. & McBurney	Brawley	1,086
Jackson, G. B.	El Centro	186
Kahn, P. & Company	Brawley	590
Katekaru Company	Brawley	450
Kunishima Brothers	El Centro	400
Leahy, Robert Company	Calipatria	200
Lister, Frank	Callexico	70
Mann, George & Company	Heber	1,230
Meloland Growers & Shippers	Holtville	200
Miller-Cummings Company	Brawley	1,760
Okano Produce Company	Heber	230
Osburn Fruit Company	Brawley	140

Table XII continued.

Name	Address	No. of acres
Pata, B.	El Centro	209
Pata, B. & Company	Holtville	160
Peppers Fruit Company	Brawley	1,358
Pilchard, D. T.	El Centro	140
Publicover & Orr	Heber	160
Rex, Don	El Centro	160
Sears Bros. Company	Brawley	330
Snyder Packing Company	El Centro	200
Steinhardt & Kelley	Calxico	340
Sun Packing Company	El Centro	450
Swastika Packing Company	Heber	320
Takahas, A. & Company	Brawley	400
Taylor, J. L. Company	Imperial	420
Union Fruit Company	Brawley	300
Urick & Hollis	El Centro	200
Wahl, M. C.	El Centro	160
Ward Fruit Company	Heber	1,290
Weaver, C. H. Company	Brawley	1,591
Whitted, E. E.	Calxico	100
Yourman, M. & Company	Calxico	350
		<u>33,142</u>

Table XIII

Cantaloupe, Honeyball and Honeydew Acreages
in the Imperial Valley, 1927

Name of Company	Cantaloupes		Honey- balls	Honey- dews
	Covered 1/	Un- covered		
Alamo Packing Company	105	500		400
American Fruit Growers, Inc.	1,459	985	20	255
Amicon, John Bro. & Co.	635			
Angeli Bros. & Luis	130	155		
Arena, A. & Company	975	300	60	125
Arkelian, B. H.	200	200		
Arrow Packing Company	20	400		
Asher, J. W.	115	20		
Bright, Fred R.	527	833		159
California Vegetable Union	600	70		
Carter Bros.				50
Eagle Packing Company		37		
Earl Fruit Company		300		200
Farmers Produce Company	450	850		200
Fawcett, W. S. Company	350	250		100
Fites, H. P.		240		
Gallagher, S. J.	225	115		100
Gerard, S. A. & Company	1,811	984	160	160
Gentile, Jos. Company	600	600		
Handy, J. W.	350		650	
Holtville Packing Company	180	60		40
Hunter, Earl B.		20		60
Imperial Produce Company	400	300		
Independent Acreage				400
Independent Growers, Inc.	165	325	40	20
Iwata, K. C.	300	300	50	80
Jack Bros. & McBurney Co.	690	455	40	165
Kahn, P. & Company	753	125	105	100
Katekaru Company	125	125	50	10
Kunishima Bros.	347	269		
McLaren, Chester		80		
Mann, George E. Company	250	700		100
Miller-Cummings Company	545	990	40	80

1/ The term "covered" means those covered with hot caps immediately after planting in order to protect the plants from freezing.

Table XIII continued.

Name of Company	Cantaloupes		Honey- balls	Honey- dews
	Covered	Un- covered		
Okano Produce Company	100	177	35	40
Osborne Fruit Company	140	520	80	
Palmer Bros.				80
Pata, B.	100	60		40
Pata, B. & Company	30	290		
Peppers Fruit Company	538	1,014		
Rivers, Burnard & Company		100		
Ryan Fruit Company	60	240		
Sakamoto, S.	160	320		
Sears Bros. Company	360		160	260
Snyder Packing Company	80	320		40
Sun Packing Company	100	600		
Swastika Packing Company	100	150		60
Takahash, A. & Company	50	50	10	25
Tamarack Ranch			200	
Urick & Hollis	40	50		40
Union Fruit Company	215	120	80	40
Wahl, M. C.	75	190		
Ward Fruit Company	530	200	90	280
Weaver, C. H. Company	320	779		
Whitted, E. E.				75
Yourman, M. & Company	50	250		
Zaferis Bros.	165	35		
Zenos & Harden	200	200	40	160
	15,720	16,153	1,910	3,944

The Imperial Valley is served by the Southern Pacific railway, one of the main lines going from San Diego, through Seeley, El Centro, Calexico, Mexicali, passing through a part of Old Mexico and on to Yuma, Arizona. Another main line comes from Los Angeles through San Bernardino, Niland and on to Yuma. A connecting line runs between Niland and El Centro.

An enormous volume of fruits and vegetables is handled by the Southern Pacific over these lines. Icing plants are located at El Centro and Brawley, but all cars are re-iced at Yuma. Yuma has one of the largest icing plants in the country. This is known as the Southwestern Ice and Cold Storage Company. It has a capacity of 250 tons per day, and a storage capacity of 18,000 tons. This plant has a railway icing platform a mile long, which is the longest icing platform in the world. One hundred eighty-six cars can be iced at one time. During the peak of the cantaloupe season as high as 600 cars per day have been iced. Two hundred and fifty men are employed to take care of this business.

Cultural Methods in the Imperial Valley

One of the most interesting facts in connection with farming in the Imperial Valley is that practically the same cultural methods are practiced by nearly all growers in the district.

Plowing is done with disc plows and tractors. After plowing the land is flooded and as soon as it is dry enough it is floated with a heavy float drawn by a caterpillar tractor. It is then ridged up into beds 8 feet wide by use of a tractor and plow with two 10-inch mould boards set like a lister. The rows all run east and west and the beds are harrowed so that the slope is to the south. The seed is planted on the south slope of the ridge by hand or by a drill. The rows are 8 feet apart and plants are thinned to about 12 inches apart in the row. The furrow made by the "double plow" is quite deep and is used as the irrigation furrow all through the season. Cantaloupes are irrigated up and after that about three or four times until harvest. The rows are all 20 rods long and are all irrigated in the same manner. Small wooden pipes are laid to conduct the water from the lateral into each furrow. These are allowed to run about 10 minutes at each irrigation which gives uniform distribution of water. During harvest they are irrigated more frequently and sometimes every day. The weather becomes extremely hot at this stage and frequent waterings are necessary. The vines are kept on top of the beds and extreme care is exercised not to mutilate the vines during picking.

During the growing season the tops of the beds are cultivated with one horse cultivators, and weeds are kept out by hoeing.

Rotations

Rotations followed in the Imperial Valley are usually three years in double crops of cantaloupes and head lettuce. This is followed with a grain crop as a nurse crop and seeded to alfalfa, which is either cut for hay, giving four or five cuttings per season, or is pastured with beef or dairy cattle for a period of three years.

Cattle do not bloat on alfalfa in this valley, and it is grazed about ten months out of the year. Grazing furnishes a small amount of fertilizer, but not sufficient to keep up the land. The heavy cropping of cantaloupes and head lettuce depletes the fertility of the soil to a great extent.

The system of "forcing" cantaloupes is practiced to a large extent in the Imperial Valley. As soon as the plants are up they are covered with hot caps. Some use a parchment paper over a wire arch. After the plants get well up, the caps are slit on one side with a knife, or, are lifted up on one side to admit air. Later the caps are removed and brush put around each hill to protect the plants and hasten the growth. This brush is a native which grows out on the prairie, and about six or eight are stuck in a semi-circle on the north side of each plant.

This extra work in forcing melons is quite expensive. The cost of using hot caps runs from \$25 to \$30 per acre and the brushing costs about \$50 per acre. Other production

costs in the Imperial Valley average as follows:

Rent per acre	\$50.00
Plowing	5.00
Floating	2.00
Fill flood borders	.75
Tear down and irrigate	.50
Bedding with tractor and plows	5.00
Working down beds	.30
Planting	.65
Thinning	9.00
Cultivating	3.00
Hoeing	3.00
Irrigating	<u>3.00</u>
Total cost per acre	\$82.20

Add to this the cost of hot caps and brush, which amounts to \$75 or \$80, and production costs per acre on the forced acreages are brought up to around \$160. Some of the large distributors stated that their production costs, including all overhead, averaged \$150 per acre, while one of the largest growers stated that it cost him an average of \$200 per acre. The average yield in normal seasons is from 175 to 300 standard crates per acre.

The use of hot caps and brush in the forcing of cantaloupes for early maturity does not always pay. The weather conditions may be such that the unprotected melons may mature almost as early as those which have been capped and brushed. The early melons always sell at higher prices, but this may not always justify the added expense involved in capping and brushing.

Harvesting Methods in Imperial Valley

The harvesting of melons in the Imperial Valley is quite highly systematized. The picking is done by Mexicans who start about 4 o'clock in the morning and finish the day's picking by 10 o'clock, or before the extreme heat of the day sets in.

Each gang of from five to ten pickers is in charge of a picking boss. The picking boss is usually a Mexican and he is responsible to the field man for quality of melons picked. The field man is responsible to the shed boss and the shed boss is responsible to the manager. The fields are generally picked over every other day. Packing is largely done at the shipping shed. The pickers use sacks strapped onto their backs in which they carry the melons to the end of the rows and dump them into field crates. These crates are picked up and hauled to the shipping sheds in large trucks.

The work at the packing sheds is also highly systematized. The melons are unloaded from the truck onto the shed platform where they are dumped into sorting bins. The packers fill the crates and then they are passed to the next man who puts the lid on with a lidding machine. They are then loaded into the refrigerator cars. A number of men are busy making crates, others are wheeling the crates to the packers, still others are putting on labels, and so on. The shed boss inspects the melons as

they are taken from the truck and supervises the packing and other shed work.

This system of packing at the shipping shed results in better grading and more uniform pack for all melons handled by the firm, which would be impossible if packing were done at a number of different field sheds. Harvesting and packing costs in the Imperial Valley run as follows: (Most of the melons here are shipped in standard size crates.)

Cost of crates, average	\$0.16
Picking and other field work, per crate	.13 $\frac{1}{2}$
Packing and other shed work	.13 $\frac{1}{2}$
Hauling	<u>.05</u>
Total cost per crate	.50

Other expense in receiving and loading at the car averages from \$7 to \$8 per car.

There are other overhead expenses in connection with the industry as it is handled by the distributors. Salaries and expenses for the general managers, field men and inspectors; also the investment in lands, sheds and equipment. The total investment averages about \$250,000 for every 1000 acres of melons grown, or an overhead in interest charges and taxes of approximately \$25 per acre per season.

The prevailing plan is as follows: The commission companies own part of the land and lease additional acre-

ages. The value is based on the average rental value of \$50 per acre. The companies own the equipment and they make labor contracts with Japanese farmers to grow the melons. These farmers are under the supervision of a foreman or farm superintendent who supervises the working of the land, planting, irrigating, cultivation, capping, brushing and all other work up to harvest. Harvesting is done by contract, but under the supervision of fieldmen and inspectors.

Inspection of Imperial Valley Cantaloupes

There are two systems of inspection in the Imperial Valley. First, State and Federal, which is optional with the shippers; and second, State and County, which is compulsory.

The State and Federal service will inspect cars at the request of the shippers and will write certificates, certifying the grade and quality and condition of the car inspected. A fee of \$5 per car is charged for this service. About 20 percent of all melons are inspected by the State Federal service. In 1927 there were eight State Federal inspectors in the district.

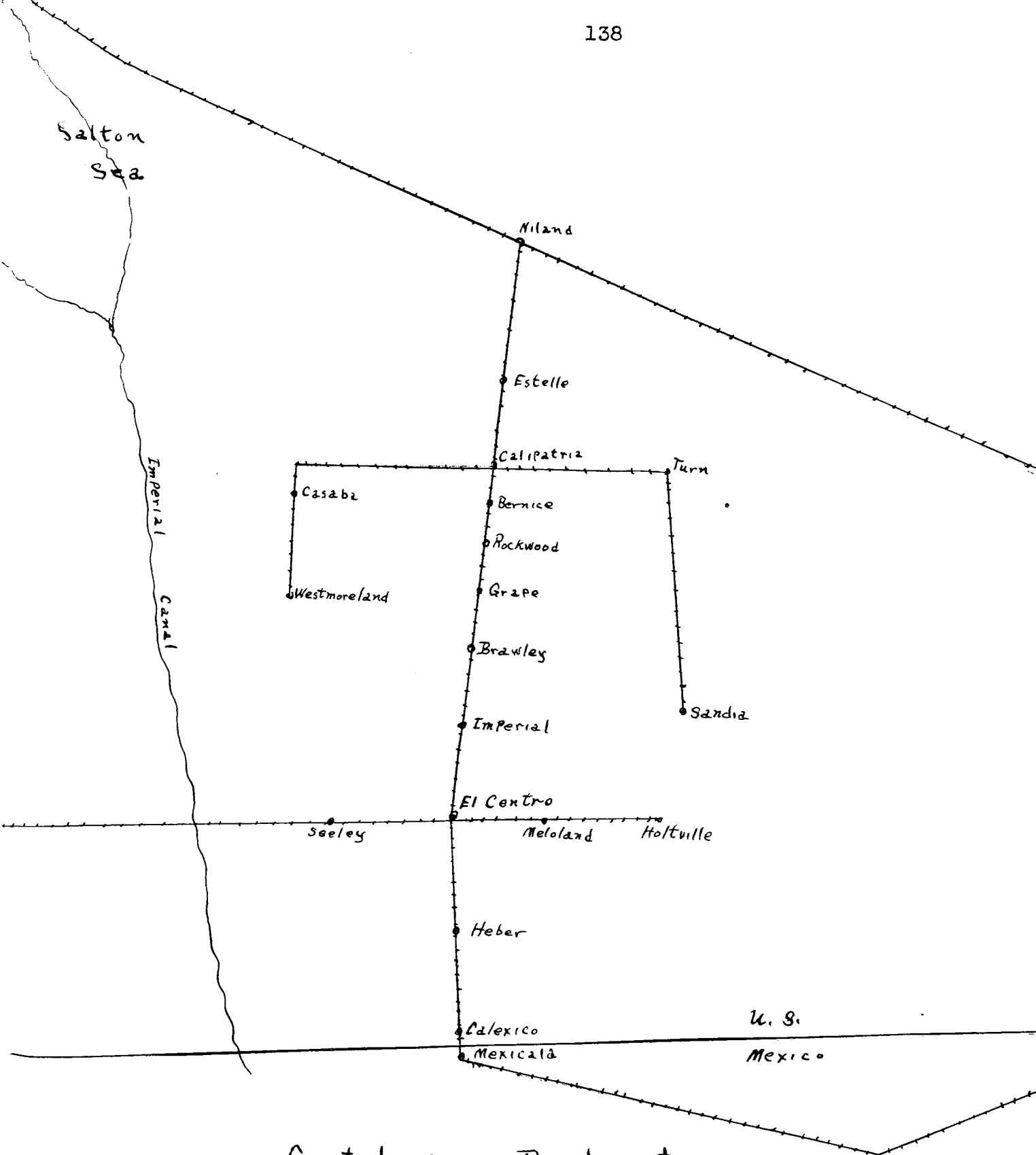
The State-County Inspection service has no connection with the State-Federal. This inspection comes under the State Horticultural Law and all cantaloupes as well as other horticultural products must be inspected by this service.

The inspectors are under supervision of a county horticultural commissioner and they have authority to condemn or stop shipments when they do not meet the requirements of regulations. The shippers pay a small fee and the balance of the expense is born by the county and met by taxation.

Diseases and Their Control

One of the most serious diseases affecting cantaloupes in the Imperial Valley is mildew. In 1926 a severe outbreak occurred which almost ruined the crop that year. Nearly all fields were affected which reduced the yield, and the quality of those shipped was very poor. A frantic effort was made to control this disease. Sulphur dusting was employed and airplanes were used to dust the affected fields.

In 1927 there was mildew in some of the fields, but the outbreak was very mild as compared with the previous season. Many of the fields affected in 1927 were dusted. There was some question as to whether the results from dusting were beneficial or not. Some stated that dusting with sulphur would cause the melons to ripen prematurely and thus injure the quality. At this time no conclusions could be drawn regarding the control of mildew.



Canteloupe District
Imperial Valley California

CHAPTER 27

CANTALOUPE PRODUCTION

Turlock District of California

The Turlock district has been a very important cantaloupe producing section in past years. The industry, however, has fallen off somewhat in late years. This is on account of the competition from many other producing sections that send their melons onto the market at the same time Turlock comes in.

The Turlock district is located on a line of the Southern Pacific railroad, 125 miles southeast of San Francisco in the heart of the famous San Joaquin Valley. The greater part of the district is located in Stanislaus County, of which Modesta is the county seat. A small part of the district is in Merced County.

The Turlock irrigation district comprises 181,000 acres under ditch. The water is taken out of the Tuolumne river by an impoundment dam at Don Pedro in the Sierra Nevada mountains, 35 miles east of Turlock. Two hundred ninety thousand acre feet usually impounded annually.

The Turlock district is highly productive and much of it is intensively farmed. The following table gives the principal crops grown and their acreages in 1927.

Table XIV
Crops and Acreages in Turlock District
1927

Crop	No. of acres
Alfalfa	37,768
Grain	20,692
Beans	17,673
Grapes	14,749
Other fruit	11,484
Corn	7,374
Sweet potatoes	4,429
Cantaloupes	3,398
Casabas	3,067
Watermelons	2,069
Rice	1,715
Miscellaneous crops	3,984
Gardens	1,666

The Turlock district is a wonderful dairy section. A cooperative creamery in 1926 made 6,023,367 pounds of butter. Well balanced farming systems are in effect and diversified cropping is quite generally practiced. Ninety-five percent of the farms are owned by the operators.

The manner of growing cantaloupes in the Turlock district is vastly in contrast with that of the Imperial Valley. The Turlock farmers plant from three to ten acres each. Rarely does one find a farm that has more than 15 acres. The melons are mostly grown independently without any assignments or contracts with shippers or commission companies. In 1927 the S. A. Gerard Company had 300 acres leased on which they were growing cantaloupes and Mr. O. G.

Olsen, a local shipper, had about 80 acres. Joe Gentelia also had a small acreage, but the balance was grown by independent farmers.

The bulk of the cantaloupes and other melons are grown in the vicinities of Ceres, Keyes and Turlock, Turlock being the main shipping point.

The soil is a light sandy loam, very porous and friable. Sub-irrigation is almost entirely practiced. This is done by holding a ditch full of water at the upper side of the field and this sub-irrigates the whole field throughout the season. The water table has been from three to four feet from the surface, but in recent years it has lowered somewhat and a few of the growers are beginning to practice irrigation by use of field laterals.

The cantaloupe industry in former years was a very profitable industry, but in recent years it has been unprofitable to the growers and the tendency is to decrease the acreage. The farmers are going more into the production of sweet potatoes, beans and miscellaneous garden crops, and also grapes. Watermelons, honeydews, and Casabas seem to hold more in favor than cantaloupes.

The varieties of cantaloupes grown are mostly 10-35, Hales Best and Perfectos. The average yield of cantaloupes has been about 300 standard crates per acre. In 1927 a total of 4,400 cars of all melons was shipped from the district. Over 90 percent are shipped to eastern markets.

Methods of Production

The seedbeds are prepared on a level, and seed is planted in drills on top of the ground. The surface of the ground is usually moist in early spring and it is not necessary to irrigate them up. As long as water is held in canals at the edges of the field it subs across a 5, 10, 15 or 20 acre tract. As the district is nearly all on a level, there is not much grade to the canals or laterals and the water can be held there.

Cultivation is done by either one or two horse cultivators, and the weeds are kept out by hoeing. The fields are generally kept clean as well as the fence corners, ditch banks, etc.

Cost of Production

Land values in the Turlock district are relatively high. In the Ceres section land sells from \$300 to \$400 per acre and rents at an average of \$40. At Keyes and Turlock the land is valued around \$600 and \$700 per acre and rents run around \$50 to \$60. The expense, in addition to rent, averages approximately \$50 per acre. This makes the average production costs run at approximately \$100 per acre.

Methods of Marketing

Prior to 1920 a large percent of the acreage of cantaloupes grown at Turlock was grown under contract for

commission companies. But at present all melons are sold for cash F. O. B. shipping point, with the exception of those grown by Gerard, Olsen and Gentelia.

A number of distributing firms come into the district each season who buy the melons on an F. O. B. cash basis. In 1927 the following companies were represented:

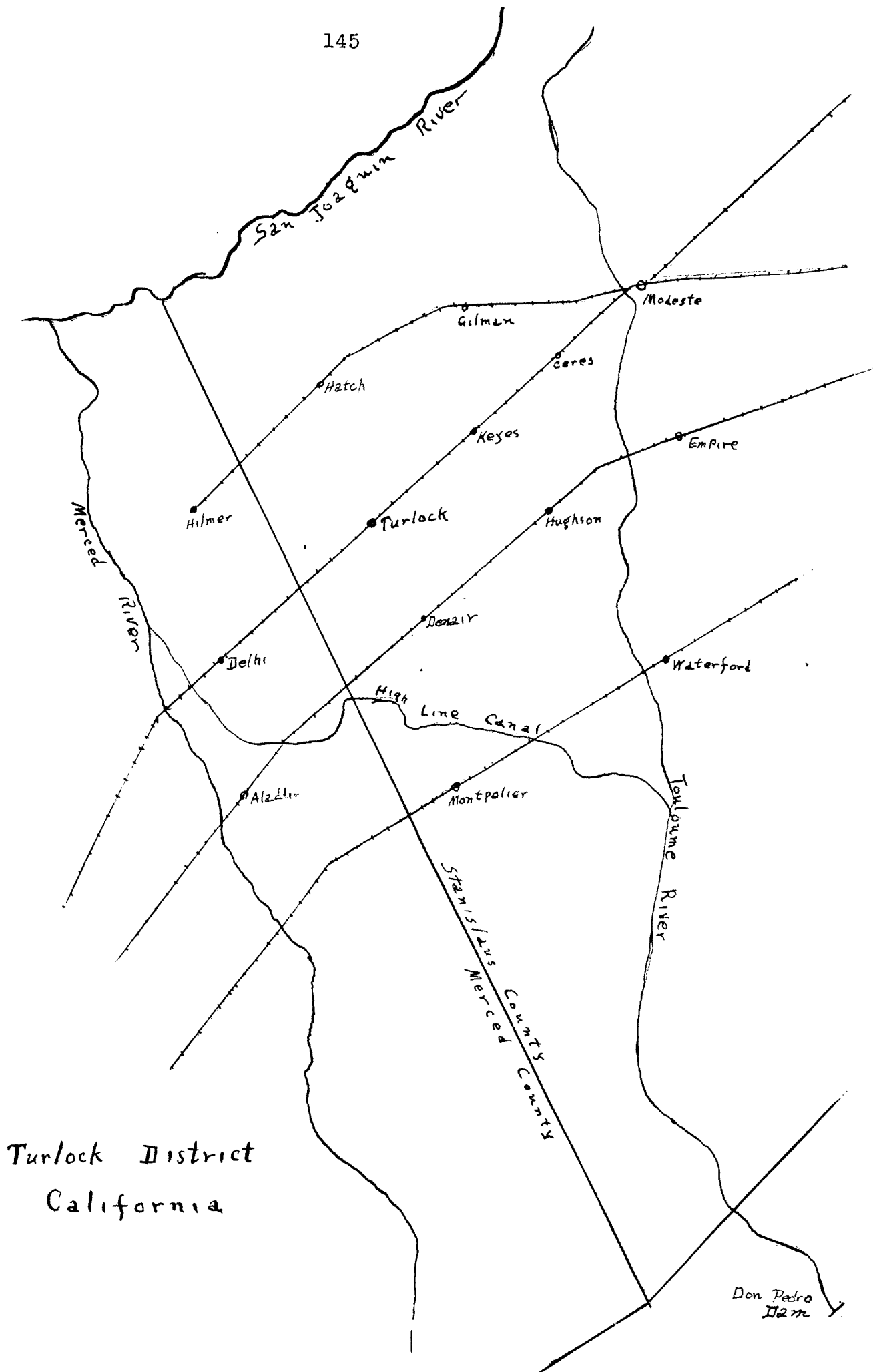
S. A. Gerard and Company
 American Fruit Growers, Inc.
 Peppers Fruit Company
 Joe Gentelia
 Produce Distributors
 Allison and Company
 O. G. Olsen
 B. F. Waymire
 Miller Cummings
 I. H. Smith
 Vignolia and White

Problems in the Turlock District

There are a number of factors that tend to decrease the acreage and also lower the yields per acre in the Turlock district. Some of these problems are as follows:

1. Depletion of soil fertility.
2. Disease and insect pests.
3. Poor markets.
4. High land values.
5. High production costs.
6. More profit in other crops.
7. Too far from markets.
8. Crop too speculative.

9. Too highly perishable.
10. Too much competition from other sections.



CHAPTER 28

CANTALOUPE PRODUCTION

Phoenix District, Arizona

The Phoenix, Arizona cantaloupe district is located in the Salt River Valley in the immediate vicinity of Phoenix. The valley is irrigated by water from the Roosevelt dam which has two main canals and irrigates 275,000 acres. Two acre-feet of water per acre of land is available at a cost of less than \$4.00 per acre per season. The cost in 1926 was \$3.69 per acre.

There is some variation in the types of agriculture followed in different localities of the Phoenix district. There is what is known as the Citrus Belt where most of the land is in fruits, especially citrus fruits. Land values are quite high. Unplanted land runs about \$500 per acre, non-bearing fruit land from \$500 to \$1000 per acre, and bearing orchards run around \$1500 per acre.

In 1927 there were 2500 acres of bearing citrus trees and 1800 non-bearing, with prospects of more being planted in the temperature belt where citrus fruits do well. There are also 820 acres of grapes in bearing from which 70 cars were shipped in 1926.

Cantaloupes are grown mostly outside the citrus belt where land values are less and run around \$250 per acre. Crops with which cantaloupes compete are cotton, corn, wheat, barley, oats and alfalfa. Spring and fall lettuce

is also produced.

Table XV
Leading Crops and Acreages
in Phoenix District, 1927

<u>Crop</u>	<u>No. of acres</u>
Cotton	80,000
Alfalfa	75,000
Fall lettuce	8,000
Spring lettuce	4,000
Cantaloupes	8,000
Citrus fruits	4,300
Grapes	1,000
The balance was in corn, grain or miscellaneous crops	

Production of Cantaloupes

The preparation of land for cantaloupes in the Phoenix district is similar to the methods used at Rocky Ford. The land is usually double plowed, and if necessary disced.. It is then harrowed and floated. Cantaloupes are planted in rows six or seven feet apart, and in hills, several seeds three to five feet apart in the row. Planting is done with a corn planter. The plants are later thinned to two thrifty plants in each hill. They are furrowed and irrigated about once each week for several weeks. Later in the season the water is held off to give better maturity and quality.

In 1927 about 20 percent were covered with hot caps,

but brushing has not yet been resorted to in the Phoenix district. It is doubtful whether it pays to use hot caps in the Phoenix district.

The harvest season usually begins about the middle of June and ends about the last week in July. Varieties grown at Phoenix are: 10-25, 40 percent; Burrell Gems, 40 percent; and H. B. Perfecto and Hearts of Gold, 20 percent. A very small acreage of honeydews, honeyballs and water-melons are grown.

Cantaloupes are grown at Phoenix under similar arrangements by commission companies as in the Imperial Valley except there are more independent growers and smaller acreages by individual growers. Commission companies usually get a three year lease on land for which they pay rent averaging \$30 per acre. They make contracts with Japanese farmers to grow the crop up to harvest time under supervision of a superintendent employed by the company.

At harvest time the crop is turned over to the company. Pickers and packers are employed as in the Imperial Valley. The pickers are mostly Mexicans and several are under one picking boss who is responsible to the company's fieldman. Packing is largely done at field sheds by regular packers employed by the company and they are under supervision of a shed boss.

Eighty percent of the crop is shipped by commission companies, but less than 50 percent is grown by these com-

panies. Commission firms handle melons on contract for independent growers on a commission basis of 16 percent on the gross sales. Eighty percent of the crop is shipped in standard crates and 20 percent in flats.

Companies operating at Phoenix in 1927 were as follows:

S. A. Gerard and Company
 American Fruit Growers, Inc.
 Steinhart and Kelley
 Miller, Barker and Company
 Stanley Fruit Company

Cost of Producing Cantaloupes at Phoenix

The following average costs per acre prevailed in the Phoenix district in 1927:

Growing the crop -	
Rent	\$30.00
Plowing (double)	10.00
Discing	1.75
Harrowing	1.00
Floating	1.00
Planting	.50
Seed	2.00
Hoeing	5.00
Cultivating	5.00
Cleaning ditches	1.00
Turning vines	2.00
Water assessment	<u>3.50</u>

Total cost per acre \$62.75

Harvesting costs (basis standard crate) -

Picking	\$0.08
All hauling, average	.04
Packing and other	
shed work	.11
Making crates	.01½
Cost of crate	<u>.16</u>

Total cost per crate \$0.40½

The average yield per acre in the Phoenix district ranges from 175 to 225 standard crates. In 1927 the average yield per acre was 190 crates. The harvesting costs on an acre basis therefore is about \$75 to \$80.

The main shipping points in this district are Phoenix, Alhambra, Glendale, Fowler, Cowden, Kese and Chandler.

Problems in the Phoenix District

While the district in which cantaloupes are grown in the Salt River Valley is especially well adapted to the growing of this crop, there are a few factors that tend to keep the industry from becoming over expanded in this district. One factor that seriously affected the district in 1927 was the prolonged over-lapping of the Imperial Valley shipments. The Imperial Valley had a relatively cool season which held back the ripening of many of the melons and large shipments were still being made after the Phoenix district began to ship. Imperial shipments did not begin until May 10, and were still shipping strong on July 20. Phoenix began June 15, had reached the peak by July 5, and by July 26 had most of the crop out of the way.

Turlock also gave Phoenix some competition. Turlock began shipping about July 10, and was shipping strong while Phoenix was still shipping a large volume into the markets. Thus, Phoenix was being squeezed by competition from two heavy producing sections at both ends of the

shipping season.

Another curtailing factor is the increased danger of plant diseases and insect pests. Mildew has caused considerable loss in the Phoenix district. Damage from Aphis has also been alarming at times. Rust and blight have also taken their toll.

Inspection Service

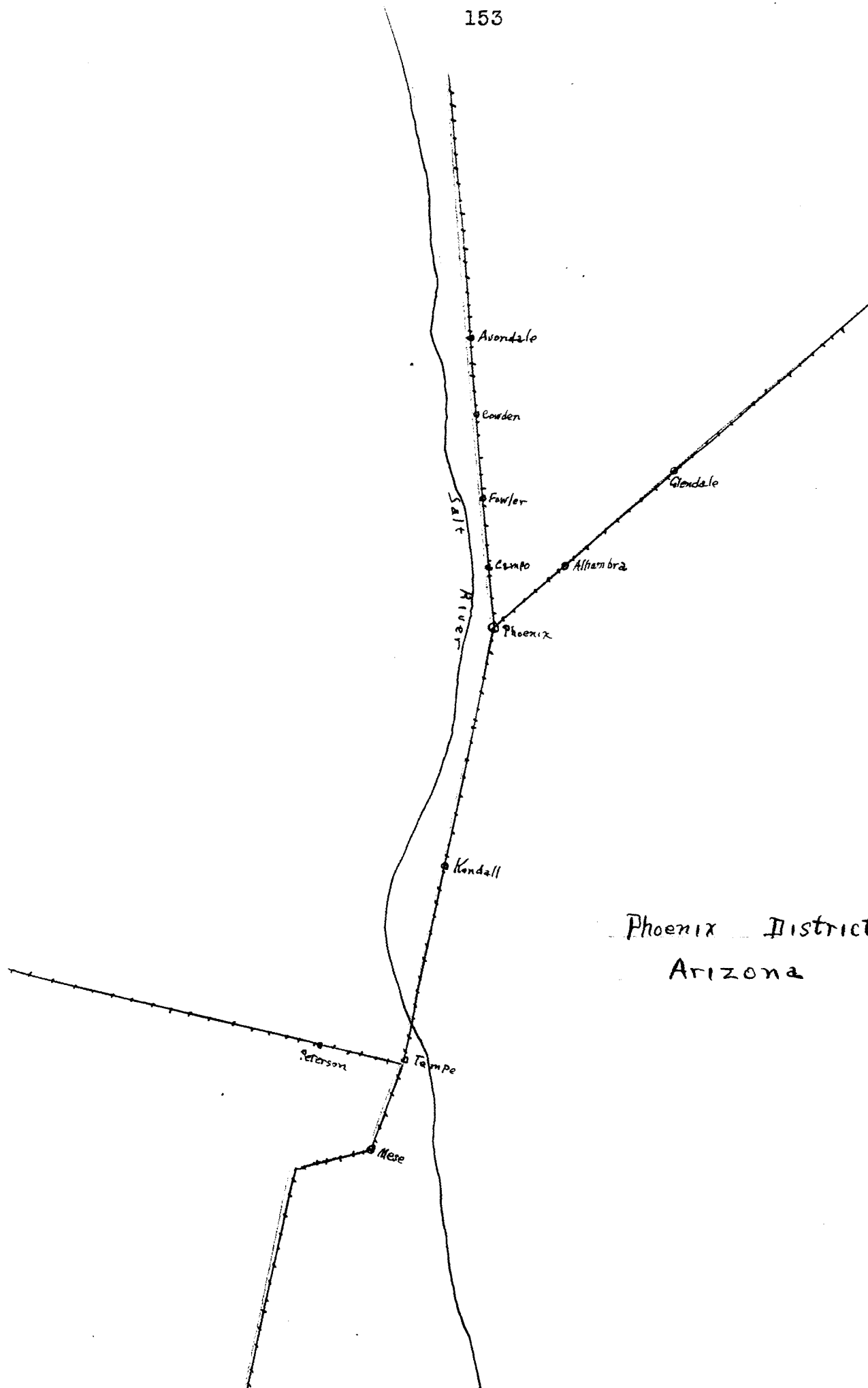
The Federal Inspection Service has been used in the Phoenix district during the past few years, but there is no compulsory inspection service in Arizona. The Federal inspection is optional and a fee of \$5.00 per car is charged the shipper who uses the service.

Yuma District

Brief mention is here made of the Yuma district which in recent years has become quite a factor in cantaloupe production. This is one of the few early districts which gives it an opportunity to get in on the early markets.

In 1927 there were about 2,000 acres at Yuma as compared with about 250 acres in 1926. By July 31 they had shipped 1,040 cars as compared with 90 in 1926. Shipments began a few weeks after the Imperial Valley had been under way, but during most of the season the Yuma district shipped right along with the bulk of Imperial Valley shipments.

This increased acreage at Yuma made Arizona, for the first time in history, the second largest cantaloupe producing state in the Union, taking this honor away from Colorado.



Phoenix District
Arizona

CHAPTER 29

CANTALOUPE PRODUCTION

Las Cruces District, New Mexico

The Las Cruces district is located in the valley of the Rio Grande in lower New Mexico, extending from Don Ana through Las Cruces, Mesilla Park, Mesquite, Vado, and as far south as Vinton, Texas.

The Las Cruces district has never been a heavy producing section, but has been of considerable importance in connecting the period between the California and Phoenix shipments, and the Colorado shipments. The shipping season usually begins about July 20 and closes around August 10 to 20.

The acreage for a ten-year period averaged 1,125, the peak acreage being 2,550 in the year 1926. In 1927 there were approximately 1,500 acres.

The Las Cruces district is irrigated by water from the Rio Grande Federal irrigation project which is under the Elephant Butte Dam.

The principal crop grown in this district is cotton. There is also some grain and corn and considerable acreages of alfalfa. Certain sections produce quite an acreage of truck crops such as celery, lettuce, tomatoes, chili, onions and sweet potatoes. There is also an important cabbage shipping industry at Las Cruces.

Cantaloupes in the Las Cruces district are grown

entirely by individual farmers, some under contract with commission companies and others independently. Acreages are usually small, running from 5 to 15 acres per farm.

In 1927 the only company which had contracts was the C. H. Weaver and Company of Chicago. Others were grown independently.

Practically the whole acreage was of the Burrell Gem variety and they were nearly all shipped in flat crates.

The average yield over a ten-year period was 270 flat crates per acre. The average price paid the growers over a ten-year period was 62 cents per flat crate. The average price received in 1926 was 38 cents per crate.

Production costs per acre are approximately as follows:

Rent, including water	\$22.00
Plowing	5.00
Harrowing and dragging	1.50
Planting	.50
Seed	2.00
Hoeing	4.00
Cultivating	3.00
Other work	<u>4.00</u>
Total cost per acre	\$41.00
Harvesting costs (basis flat crate)	
Cost of crate	\$0.12
Picking	.02½
Packing	.04
Hauling	<u>.01½</u>
Total cost per crate	\$0.20

On an acre basis for an average yield of 270 crates per acre, the harvesting costs come to \$54 per acre. This

makes the total cost of producing and marketing cantaloupes at Las Cruces come to \$95 per acre, not including certain overhead expenses which were not figured in.

The average returns over a ten-year period were \$119.33 per acre, while the receipts in 1926 averaged \$108.75 on a yield of 284 flats per acre. According to these figures there is a slight margin of profit to the average grower on cantaloupes in the Las Cruces district.

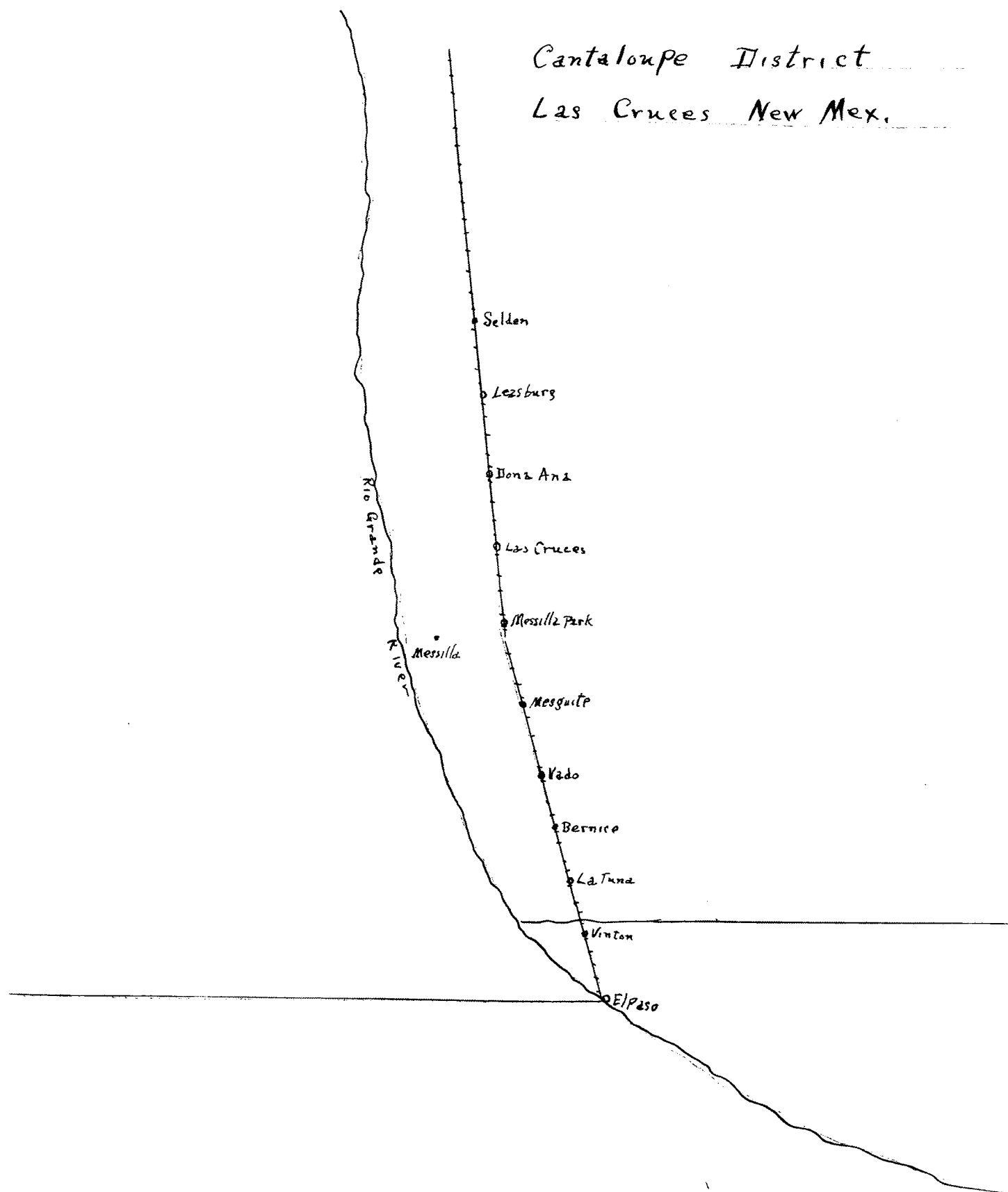
The companies operating in 1927 were as follows:

C. H. Weaver and Company
Steinhart and Kelley
American Fruit Growers, Inc.
S. A. Gerard and Company
Stanley Fruit Company
Hannagan Bros.

There is no inspection service in the Las Cruces district. The general feeling of the growers was that such a service would insure better quality shipped out.

Cataloupe District

Las Cruces New Mex.



F. CANTALOUPE PRICES

Department of
Economics & Sociology
CHAPTER 30 State Agricultural College
CANTALOUPE PRICES Fort Collins, Colo.

The price factor is perhaps the most important factor in the matter of making profits in the cantaloupe industry. This includes consideration of the price received at the farm and also the price paid in the consuming center.

Generally there is a wide spread between the price received by the grower and the price that the ultimate consumer must pay. This spread, on account of the nature of the product and the manner in which it must be handled, is of necessity large, but there are many people who seem to feel that the difference is in many cases altogether too much. The grower complains that the price he receives is generally too low and the consumer complains that the price he pays in in many cases too high.

There are a number of factors which brings about this difference. In the first place cantaloupes are highly perishable, therefore they are a risky product to handle. The dealers in the market centers must get them into the hands of the consumers as quickly as possible in order to avoid loss from spoilage.

The quality is often extremely variable. Some lots may be of excellent quality and if the demand is good, a high percent of these will reach the ultimate consumer and give entire satisfaction. On the other hand, some lots

may be of such inferior quality that only a small percent is actually consumed, and even those that reach the consumer's table may not be altogether relished or give satisfaction. We know of several instances where entire carloads were shipped that had been picked too green and were unfit for consumption. Others have been shipped from diseased fields where the vines had died or had been shipped to market from fields where insects, such as the melon aphid, had destroyed the vines to such extent that the melons were not fit to be shipped. Often they are allowed to become too ripe before picking and such melons become soft and unsalable before they reach the consumer.

Markets often become glutted and dealers find themselves overstocked with cantaloupes which they cannot sell because of poor demand. Under such conditions melons are offered at sacrifice sales, and large quantities are often dumped. Then there is the competition with other fruits such as berries, grapes, peaches, etc., which consumers can substitute for cantaloupes. Weather conditions in consuming centers also have an important bearing on cantaloupe consumption. Cold and wet weather often causes a material decrease in the consumption of cantaloupes.

All of these factors together with transportation costs, icing costs, cartage expense, commission charges and other overhead handling costs, bring^{about}/this seemingly enormous spread in price of cantaloupes between what

what the producer receives and what the consumer pays.

The average yield over a ten year period is 146 standard crates per acre and the average cost of production and harvesting is approximately \$116 per acre. The cost per crate is approximately 80 cents. Thus the grower must get an average of 80 cents per crate in order to break even.

The following table taken from the summary of the U. S. Market News Service shows the average prices received each season over a period of eleven years at the shipping points on standard crates.

Table XVI

Year	Average price per crate
1918	\$1.35
1919	1.40
1920	1.40
1921	.84
1922	1.75
1923	1.69
1924	1.19
1925	.91
1926	1.17
1927	1.05
1928	.94

The average over the eleven year period was \$1.24 per standard crate. Comparing this with the production and harvesting costs, which average in recent years about 80 cents per crate, would indicate that there is a margin of profit to the average grower under these conditions.

These summaries, however, are obtained from the United States market reports which do not quote the prices on the last several days' shipments. The cleanup shipments are usually of very poor quality and condition and generally bring a lower price. Thus the average for the whole season is somewhat lower than these figures indicate.



Prices recieved at shipping points
in Colorado for Canteloupes
During Period 1918 - 1928

CHAPTER 31
WHOLESALE AND JOBBING PRICES
AT CONSUMING CENTERS

While it is difficult to get an accurate average price quotation for each season in the several market centers, yet we can get some idea from the seasonal price range in some of the key markets as to the general jobbing prices paid as shown by the daily market reports. Table XVII gives the general seasonal price range in six representative markets over a period of eight years.

In some seasons there is a much wider range in price quotations at certain markets than in other seasons, or a greater price fluctuation in some years. Also in some instances we find at certain times lower price quotations in some of our distant markets than we have at our nearby markets. We find at times higher prices being quoted at Denver than at New York City or Boston.

The following examples show how the price fluctuates at different times during the season in a few of the large markets.

New York City

	<u>1924</u>	<u>1925</u>	<u>1926</u>	<u>1927</u>
Aug. 16-22	\$ 3.75-4.00	\$ 1.00-1.25	\$1.00-2.00	\$ 2.50-2.75
Aug. 23-30	3.25-4.00	1.50-2.00	1.75-3.30	2.00-2.25
Sept. 1-6	1.25-2.50	2.00-3.00	1.25-3.00	1.25-2.00
Sept. 7-13	2.00-3.00	1.75-3.50	1.25-2.50	1.50-2.25
Sept. 14-20	2.50-3.00	1.50-3.00	1.50-1.75	1.25-2.25
Sept. 21-26				

Boston

	<u>1924</u>	<u>1925</u>	<u>1926</u>	<u>1927</u>
Aug. 16-22	\$	\$	\$3.50-4.00	\$
Aug. 23-30		1.50-3.00	4.00	
Sept. 1-6	4.00-4.50	1.25-2.00	2.00-3.20	1.25-2.50
Sept. 7-13	2.00-3.50	1.50-2.75	2.00-2.50	1.50-2.25
Sept. 14-20	2.00-3.00	2.50-3.50	1.75-2.75	1.50-1.85
Sept. 21-26	2.50-3.00	1.50-3.00	.75-2.50	1.00-2.00

Pittsburg

Aug. 16-22	\$	\$3.00-3.50	\$ 4.25	\$
Aug. 23-30	4.25-5.00	2.00-2.75	2.50-3.25	
Sept. 1-6	3.25-4.00	1.75-2.25	2.50-3.00	2.00
Sept. 7-13	2.35-3.50	1.50-2.50	2.50-2.75	1.75-2.00
Sept. 14-20	2.00-2.50	2.35-2.75	2.00-2.75	1.50-2.00
Sept. 21-26	2.00-2.75	2.00-2.75	1.00-2.50	1.50-2.25

Chicago

Aug. 16-22	\$	\$2.00-2.75	\$ 3.50	\$
Aug. 23-30	3.75-4.50	1.50-2.50	2.00-2.75	
Sept. 1-6	2.25-3.75	1.00-1.50	2.00	
Sept. 7-13	1.50-2.50	1.00-1.75	2.00	
Sept. 14-20	1.25-2.00	1.50-2.50	1.25-2.25	
Sept. 21-26	1.50-2.00	2.25-2.50	1.25-1.50	

The price quotations in 1927 were mostly on flats and therefore the figures were not used in comparison with prices for standards in other years. The flat crate is gaining in popularity in most markets.

It will be noted that there is a wide difference at these markets in different seasons. The 1924 season was generally good in all markets. The price started out high during the latter part of August and while it gradually declined during September, yet the general price at all key markets kept up quite well.

By looking at the weather report we find that the 1924

season was one of extremely low rainfall, but there was sufficient irrigation water to produce a good crop. The quality was exceptionally good and thus the Colorado melons were in demand and consequently brought a good price.

The 1925 season was not so good. With extremely wet weather in July and August the quality was very poor and the price quotations in all markets were relatively low.

During the 1926 season, the Colorado cantaloupes again showed good quality, weather conditions were quite favorable and the prices in most markets were satisfactory. This was the season that mildew nearly ruined the Imperial Valley crop and the general price of cantaloupes was low in the markets throughout the season. However, as soon as the Colorado melons came onto the market and were found to be of excellent quality, the price immediately took a jump. Prices declined somewhat during the shipping season but were generally quite satisfactory.

The general prices during 1927 were relatively low and the season was considered unprofitable to the shippers as well as to some of the growers.

As a general rule there is a direct correlation between the quality of the melons and the price received which is illustrated by the returns for these four seasons.

Table XVII

General seasonal price range in six representative markets, 1921-1928.

Year	New York	Boston	Pittsburg	Chicago	Kansas City	Denver
1921	\$1.00-4.50	\$1.50-5.00	\$1.25-3.50	\$1.25-3.50	\$1.00-2.75	\$1.00-2.75
1922	1.00-5.00	1.00-5.00	1.00-3.00	1.00-4.00	.75-3.50	.75-3.00
1923	1.25-3.50	1.25-3.50	1.25-3.00	1.00-2.50	1.00-3.00	1.00-2.50
1924	1.25-4.00	1.15-4.50	1.15-5.00	1.00-4.50	1.00-3.25	.80-4.50
1925	1.25-3.50	1.25-3.50	1.50-3.50	1.00-2.75	1.00-1.75	1.00-2.00
1926	1.00-3.20	.75-4.00	1.00-4.25	1.25-3.50	1.50-2.50	1.00-3.50
1927	1.25-2.25	1.00-2.50	1.50-2.25	1.00-2.25	1.25-2.25	1.25-3.00
1928	1.75-5.50	2.00-5.00	1.50-4.50	1.50-3.75	1.50-3.75	1.50-3.85

CHAPTER 32

RETAIL PRICES AT CONSUMING CENTERS

It is after cantaloupes have left the hands of the jobbers and wholesalers that costs in handling and price increases mount quite rapidly. The average retailer will order a crate, or several crates, depending upon the size of his business, from the jobber or wholesaler. The retailer opens the crate and offers them for sale to the final consumer. The customer generally selects from this crate what he thinks are the best eating melons and the poorer ones are generally pushed back to the very last. These melons become soft and, if sold at all, must be sold at a discount. There is nearly always some waste and sometimes a very large percent eventually has to be dumped. The retailer certainly has his share of grief when it comes to handling this highly perishable product. He must figure on a relatively high margin of profit in order to be safe. This is usually from 20 to 25 percent on what he actually sells and even then in some instances he sustains a loss.

In order to keep cantaloupes moving freely in the markets, the price to the consumer must not get too high, at least not out of line with other products on these markets which might be substituted. In most consuming centers when the price gets above 15 cents each they do not move so very rapidly except early in the season when

the demand exceeds the supply. In most of the cities during the peak shipments cantaloupes move best when they can be retailed at from 10 to 15 cents each. The quality of course always determines to what degree cantaloupes will be in demand and what people will be willing to pay for them. In case of poor quality they may pass through the hands of the jobbers and wholesalers quite readily, but are a drag on the hands of the retailer and a disappointment to the consumer. This of course reflects back to the jobber and wholesaler, as well as to the distributor and to the grower by a general reduction in price for all melons.

The greatest spread in price between what the consumer pays and what the producer gets is noticed in ordering cantaloupes at first class hotels, restaurants, dining cars and other high class public eating houses. In such places we often see on the menu card "Half cantaloupe 25 cents." The price generally paid does not fluctuate with the prices paid at the markets. We know of an instance where a first class hotel, located in one of the large producing sections, was serving half cantaloupes at 25 cents when the growers in that section were receiving 90 cents per standard crate. The grower in this case was selling them at 2 cents each while this hotel was getting 50 cents a piece for them. This was not, however, a case where the value of the cantaloupe caused the hotel keeper to demand that

price, but the patrons here were paying for service and prestige which goes along with these high class dinners. This high quality of service generally costs these places a great deal of money and those who want such service must be willing to pay for it. Fortunately those who are not willing or who cannot afford to pay for this service can find other places where cantaloupes are served at very much lower prices. Ordinary eating houses in most places serve them at 10 or 15 cents for a half cantaloupe when they are in season.

With cantaloupes, as with most other products, the ultimate consumer is the person who must be satisfied. If cantaloupes are too high in price he will not buy very many, and if they are poor in quality he will not continue to buy them very long. It behooves the grower and distributor to offer him only melons of good quality and at a reasonable price so that he will be satisfied and continue to be a good customer.

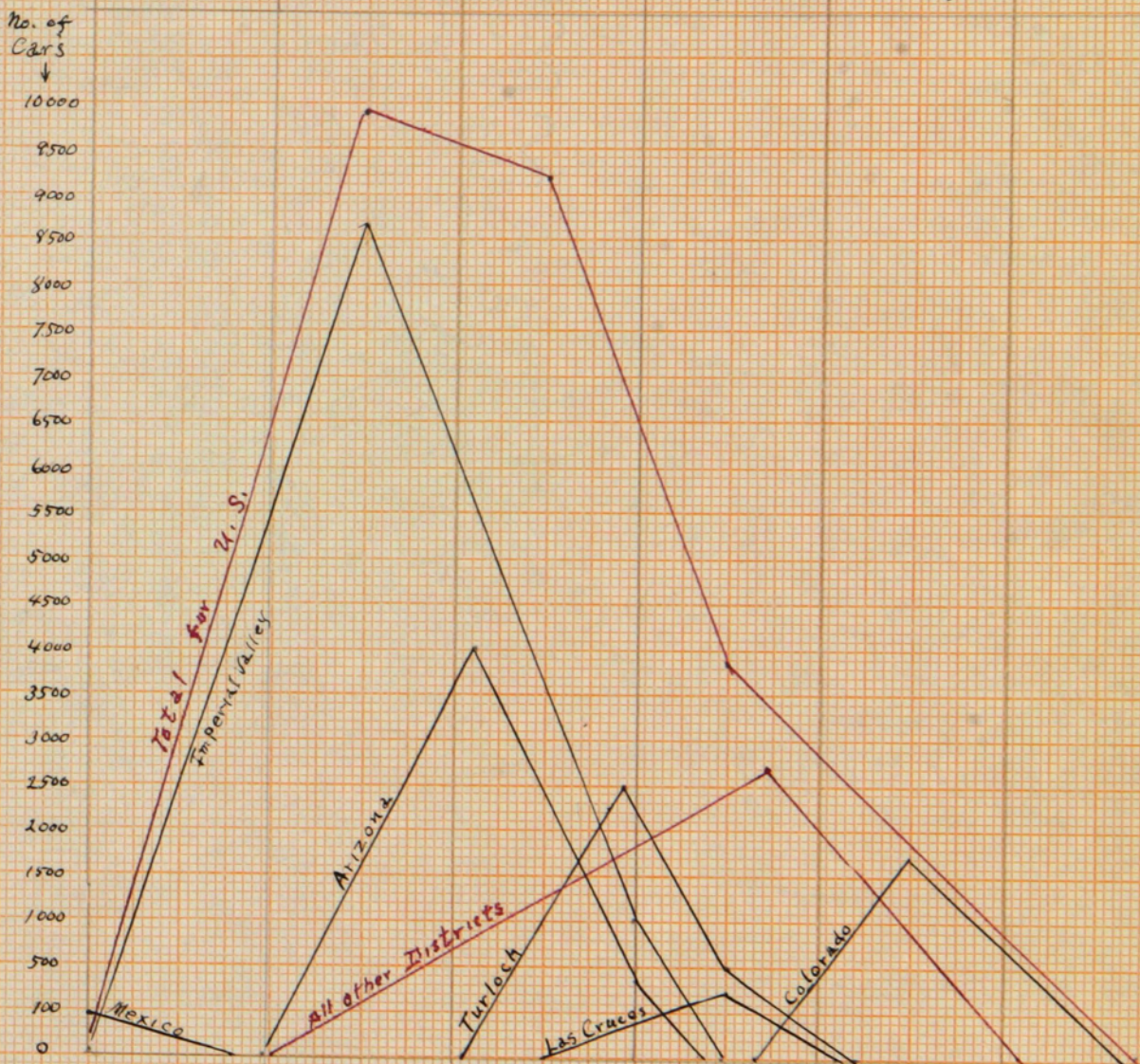
There is a great difference in the number of cantaloupes consumed per capita at the different markets. The State College of New Mexico submitted some figures obtained in 1926 regarding consumption per capita in a number of cities. The number of inhabitants per car at Boston was 478, Pittsburg 482, and Fort Worth, Texas, 5,709. Cities where there were less than 1,000 inhabitants per car were Cincinnati, Cleveland, Los Angeles, San Francisco,

Kansas City and Denver. Other cities where there were over 1,000 inhabitants per car were Birmingham, Chicago, Dallas, Detroit, Philadelphia, St. Louis and Salt Lake City. This difference is perhaps due to a number of reasons but we are of the opinion that the main reason is that the markets have not been as well developed for cantaloupes in some cities as in others. There are still cities where cantaloupe consumption could be very materially increased.



Number of Cars Canteloupes
Shipped from Colorado points
During period 1914-1928

Total Cars Shipped in U.S. →	May	June	July	Aug.	Sept.	Oct.
	4295	9778	9141	3708	1965	81

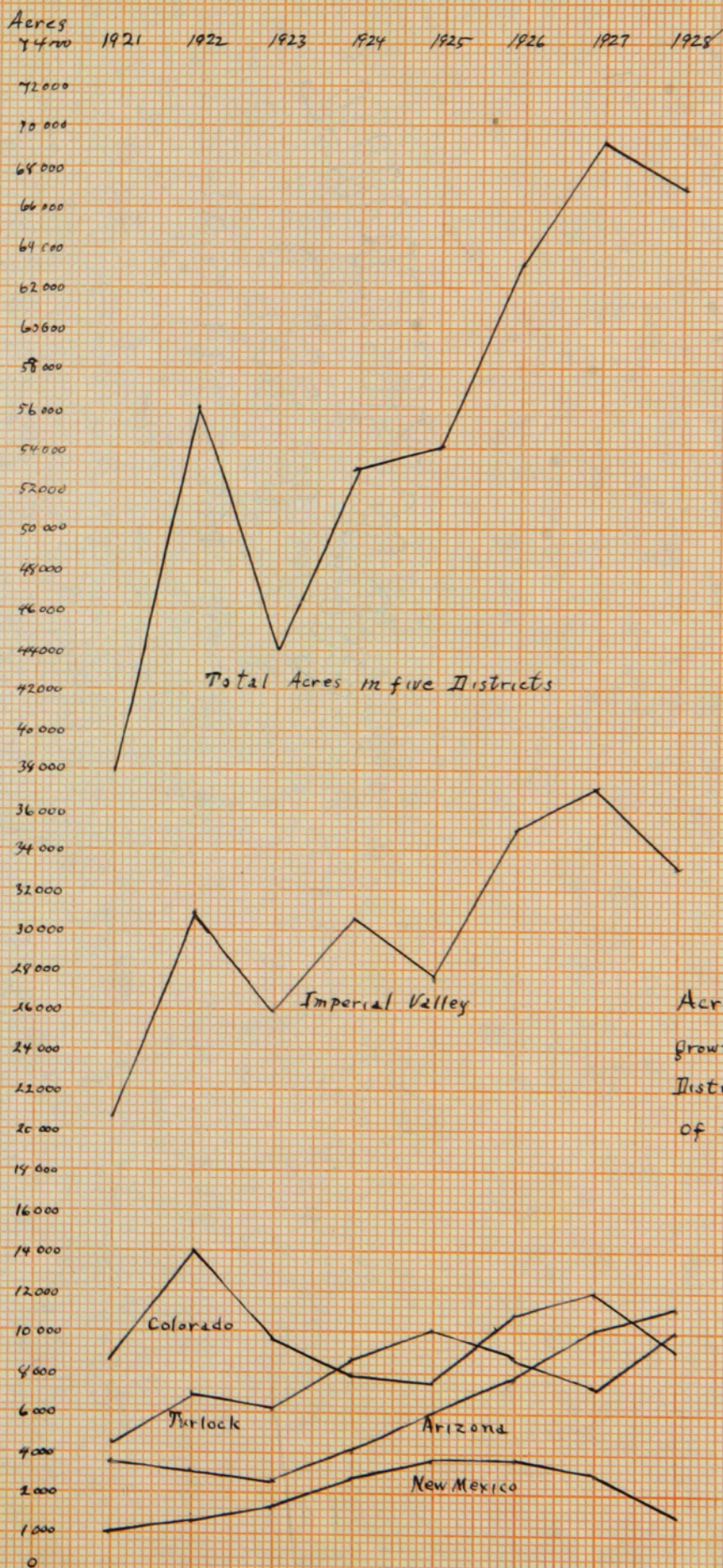


No. Cars Canteloupes Shipped by Districts

2nd

Total Cars shipped each month in U.S.

1928



CHAPTER 33

RELATION OF PRODUCTION TO MARKET DEMANDS

Cantaloupe production is generally considered to be a highly speculative enterprise. Over-production is easily possible, and there are seasons when markets are over-supplied, and when prices are very unsatisfactory. As a general rule, however, the production is not far out of line with what the markets can readily absorb, providing there is a proper distribution of the product.

During the early years when commercial production of cantaloupes was confined to the Rocky Ford district, the consumption season was limited to a few months in the fall of the year when the Rocky Fords were available. When the Imperial Valley and other southern districts came into production, the greater consumptive demands shifted to the earlier months of the year. The greater consumption now takes place during the month of June. The demand is for early cantaloupes and the distributors are constantly striving to get them onto the market as early in the season as possible. The early melons usually bring the highest prices.

In late years the first shipments of the season have been imported from Old Mexico. In 1928 a total of 95 cars were shipped in from Mexico during the months of April and May. These generally sold quite readily at relatively high prices in our markets. The earliest shipping district

in the United States is the Imperial Valley. Shipments here usually begin about the first part of May. The heaviest shipments occur during the month of June after which there is a gradual decline to the close of the season which is usually from the middle of July to the first of August.

The Phoenix district usually begins shipping about the first week in June. As the Imperial Valley shipments decline the Phoenix shipments increase, reaching their peak about the first or second week in July, after which they decline quite rapidly and are generally through by the middle of August.

The Turlock district, as a rule, begins shipping about the first week in July. The peak of the season for this district is usually reached during the last week of July after which shipments gradually decline, coming to a close from about the first to the tenth of September.

While Las Cruces is not a very heavy shipping district, yet it fills in a "gap" at a time when the California and Arizona shipments have fallen off considerably and before the Colorado season begins. The season at Las Cruces extends from the middle of July to the first of September.

The Colorado crop comes in quite late in the season. Shipping usually begins from the middle to the twentieth of August and continues until the vines have been killed

by frost and melons are no longer fit to ship.

Some of the large distributing firms who operate in several of the producing sections try to adjust their acreage to meet the market demands throughout the season. An effort is made by most of the large distributors to stabilize shipments and keep the various shipping districts in line with what the markets will absorb. Early in the season surveys are made to determine the acreages that will be planted in the various districts. It is surprising how closely they are able to check on the intended plantings throughout the commercial producing districts of the western states. It is more difficult to get an accurate check on the intended plantings in the eastern states as this is mostly in the hands of independent growers. Most of the eastern districts get onto the markets during the months of August and September, or about the same time that the Colorado season is on. At present there are some twenty states besides California, Arizona, New Mexico, and Colorado that ship commercial cantaloupes.

A source of supply that of late has been giving the western shipper a great deal of concern is the market gardener near the large cities. The individual gardener as a rule does not plant a very large acreage, but there are so many of them that the total volume thus produced is of considerable consequence. In many cases it is sufficient to supply the needs at certain times of the year, in some

of our cities.

The total cantaloupe production in the 23 commercial producing states has during the past 7 years averaged 98,120 acres per year with an average of 13,980,000 standard crates per year.

The following table gives the number of acres grown each year during the seven-year period.

Table XVIII

Year	Number of acres
1922	103,300
1923	84,160
1924	95,250
1925	93,260
1926	101,690
1927	108,780
1928	100,400

During the years 1927 and 1928 three states, namely, California, Arizona and Colorado, produced 63 percent of the total cantaloupes consumed in the United States.

CHAPTER 34
THE PRODUCTION OF CANTALOUPE NEAR LARGE
MARKET CENTERS

In order to get some authentic information regarding the production of cantaloupes by truck growers and market gardners near some of the large market centers, a questionnaire was prepared and sent to a number of specialists and county agents in some of the eastern states. Extracts from the replies of these inquiries indicate that a large volume of cantaloupes are being grown by truck growers near the large cities and by farmers in certain section of the eastern states, and that the trend is for greater production in these sections.

Mr. Taussig of Columbus, Ohio makes the following statement: "I estimate that there are about 1,500 acres of commercial cantaloupes grown mostly along the lake shore near Cleveland and Toledo, and also some along the Ohio river. None have been shipped out of the state and most of them are marketed by truck in the nearby cities."

Mr. W. B. Nissley of State College, Pennsylvania says that "Pennsylvania does not grow many cantaloupes for market as the soils are not well adapted. A few that are raised are sold locally in nearby markets. A large volume of cantaloupes grown in Maryland and Virginia, however, are being trucked to the cities of Pennsylvania. Paved roads and fast motor trucks make it possible to haul melons as far as 300 miles. These trucks travel most at night. Commercial men of Pittsburg and Philadelphia and other eastern cities go to the Maryland and Virginia east shores and purchase large volumes of cantaloupes and other produce for their markets."

From Mr. C. H. Nissley of New Brunswick, New Jersey we have the following report: "Many cantaloupes are being

grown in Delaware and New Jersey and as far up as Albany, New York. These melons are mostly hauled to market by truck, the distance averaging about 100 miles. The trend is toward greater production because of the good market, the soil is ideal, and the climate is very good. I would say that the industry will keep on increasing."

Mr. Weaver of Urbana, Illinois states that "a large volume of cantaloupes are being grown in Illinois, Union County being the center of cantaloupe production, and most of this is trucked to Chicago."

The Extension Agent at Leavenworth, Kansas states that "some cantaloupes are being grown near Leavenworth mostly for local market, but some are trucked to Kansas City."

The County Agent at Kansas City, Kansas gives the following information: "We have a large local supply of cantaloupes in this section. Truck farmers in the Missouri and Kaw river valleys generally supply the demand from about the tenth of August through the rest of the season. They are mostly hauled into Kansas City by truck at night. the average distance being about 50 miles."

Topeka, Kansas, according to the report of the County Agent, is supplied with local cantaloupes beginning August first, through the rest of the season.

A number of men in Washington, who had knowledge of the situation, were interviewed relative to the production of cantaloupes near the market centers. The information thus obtained indicates that there is a trend toward increased production of cantaloupes near many of the large cities.

Up to the present time there has been no consistent effort made by the truck growers of the eastern states to put out a standard pack. Cantaloupes are being sold in

all kinds of containers such as tomato crates, lettuce crates, hampers, baskets, and in boxes of all sizes and descriptions.

One of the Washington officials made the statement that "if the growers near the market centers would pack their melons in standard crates such as are being packed by the western growers, the far distant growing sections would not be able to compete with these market gardeners."

It is perhaps a fact that the cantaloupes grown in the eastern states are not of as good quality as those grown under more ideal weather and climatic conditions in the irrigated sections of the southwest, yet the eastern grower can allow his melons to thoroughly ripen on the vines, can get them onto the market within 24 hours after picking, and thus in many cases have a better condition than those that were picked too green, and where it took several days after picking before they were placed on the market.

CHAPTER 35

OTHER COMMERCIAL PRODUCING SECTIONS

Bakersfield, California produces annually from five to six hundred acres mostly for western coast trade. These melons come in after the Imperial Valley is through shipping and before the Turlock season begins.

At Yakima, Washington they grow an average of about 750 acres. Most of the melons from this section are shipped to Seattle, Portland and other western coast cities. The industry here will develop only as the western markets grow in demand.

A small acreage has been grown at Las Vegas, Nevada, but so far the shipments from here have not exceeded 100 cars per season.

Basin, Wyoming has recently been growing small acreages of cantaloupes. This section seems to be well adapted but so far has not been of a great deal of importance. This district, however, has possibilities.

The Grand Junction and Delta sections on the western slope of Colorado have in late years developed into commercial cantaloupe production. Prospects are that these sections will show some increase in acreage in the future as they are well adapted to the production of this crop.

A limited acreage is being grown in the Greeley district in northern Colorado. The variety grown in this district is known as the Greeley Wonder which is a fine

flavored melon, and good for home consumption, but is a large coarse melon and awkward to pack so perhaps will not become much of a factor in shipping to distant markets.

Some cantaloupes are being produced in the lower Rio Grand Valley of Texas. In 1924 over 1,000 acres were grown in this section but since that time the acreage has gradually been reduced. In 1928 but 230 acres were grown.

The important cantaloupe producing states of the middle west are Indiana, Arkansas, Illinois, Oklahoma, Kansas, Michigan and Tennessee. The eastern states where cantaloupes are being grown in large quantities are New Jersey, Maryland, Delaware, North Carolina, South Carolina, Georgia and Florida.

Table XIX

Acreage of Commercial Cantaloupes by States
1922-1928

States	1922	1923	1924	1925	1926	1927	1928
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
<u>Early</u>							
Calif.							
(Imp.Val.)	31,330	26,100	31,000	27,560	35,300	37,920	33,460
Fla.	840	2,520	660	370	380	420	920
Ga.	8,410	5,070	2,980	750	700	710	650
Texas							
(Lower Val.)	370	1,100	1,050	750	350	180	230
<u>Intermediate</u>							
Ariz.	2,700	2,000	4,000	6,000	7,000	10,000	10,000
Ark.	7,510	3,900	5,810	7,930	7,310	5,410	6,170
Calif.							
(Other)	7,380	6,770	8,890	10,620	8,380	7,800	10,250
Del.	4,080	3,200	1,740	2,500	2,000	2,000	1,940
Ill.	880	720	370	400	400	200	420
Ind.	3,300	3,550	4,320	4,820	4,320	4,380	4,640
Md.	5,560	4,900	5,930	5,570	6,120	7,100	6,040
Nev.	1,400	1,400	200	270	160	100	250
N. C.	3,960	2,290	2,570	2,010	2,100	2,310	2,310
Okla.	400	100	450	560	630	330	500
S. C.	1,510	1,070	560	400	620	750	640
Texas							
(Other)	540	870	3,790	2,250	2,030	2,030	2,070
<u>Late</u>							
Colo.	14,000	8,620	8,040	7,900	11,670	12,100	9,000
Iowa	1,020	930	900	1,000	1,120	1,130	1,410
Kan.	50	180	1,000	450	450	450	450
Mich.	1,500	1,700	1,650	1,500	1,280	1,220	1,630
Nev.			730	660	350	300	150
N. J.	3,360	3,860	4,550	4,320	4,500	4,000	3,400
N. Mex.	1,100	1,400	2,100	2,600	2,600	2,500	1,400
Tenn.	350	880	360	560	600	480	470
Wash.	1,120	770	1,600	1,510	1,300	1,960	2,000

Total Acreages

1922	-----	103,300	acres	1926	-----	101,690	acres
1923	-----	84,160	"	1927	-----	108,780	"
1924	-----	95,250	"	1928	-----	100,400	"
1925	-----	93,260	"				

G. FINANCING THE CANTALOUPE INDUSTRY

CHAPTER 36

USUAL METHODS OF SECURING CREDIT

Nearly all lines of present day business must have some financial backing in order to exist and the matter of producing cantaloupes is no exception to this. The production of cantaloupes is a highly speculative enterprise and involves a great deal of financial assistance. A few of the more conservative growers are perhaps in position to produce a crop without much need of borrowing money, but there are a large number of growers who could not grow cantaloupes without some financial assistance. Approximately 75 percent of the growers of the Arkansas Valley borrow money in order to be able to grow a crop of melons. It is necessary in most cases to have some money with which to pay the labor essential to properly care for the crop and other production expenses.

The usual methods of securing credit are from the local banks and from the distributing companies. Some of the distributing companies make it a part of their regular business to finance those who are growing for them under contract, in case they are in need of credit.

Approximately 50 percent of the credit extended to growers for the production of cantaloupes is furnished by the local banks and nearly as much is handled by the distributing companies or commission firms operating in this district. Very little financing is done by private indi-

viduals or other agencies, with the exception of a few landlords who take care of their tenants in such cases.

A typical agreement between the grower and distributing company in the matter of financial aid in the production of cantaloupes is as follows, and is usually entered into at the time the contract for growing the crop is signed.

Agreement

It is mutually understood and agreed by and between the parties hereto that in the event of the distributor furnishing financial aid to any growers shipping under this agreement, such financial aid shall be considered as a loan to the grower and be evidenced by a promissory note bearing ____ interest which the grower agrees to give therefor. The grower further agrees to give the distributor as security for such loan a first mortgage on the cantaloupe crop and likewise insure such crop against loss or damage by hail and name the distributor as beneficiary in said policy for not less than the amount of such loan. In case the grower fails to insure said crop as stated, the distributor shall be permitted to insure said crop in its favor for not to exceed the amount of such loan made to the grower plus value of seed furnished and the amount of the premium for such insurance. In case the crop is not damaged by hail the distributor shall have the privilege to collect from such grower the amount of such insurance premium by deducting same from the cash advances mentioned in the contract. It is also agreed that the distributor shall have the privilege to deduct any loans made to the growers with interest due from any monies due the grower at any time, or times, during the term of this agreement, and if not so paid, the unpaid portion shall continue as an obligation of the grower to the distributor.

In witness whereof, the parties hereto have hereunto set their hands and seals.

By _____

By _____

In case loans are obtained at the local banks for the production of a crop of cantaloupes or other varieties of

melons, the banks generally require additional security to taking a first mortgage on the crop. Banks generally find it necessary to require this additional security because of the many hazards involved. Even after the crop has been produced to maturity a number of things might happen which would render it a total loss. Damage from aphids, hail, wet weather during harvest, poor markets, and low prices are all factors, any one of which might cause the loss of a crop of cantaloupes.

The interest rates charged by banks are also generally higher than those charged by distributing companies. Banks charge 10 percent while loans are frequently made by the distributors at 6 percent interest.

The distributing firms whose business it is to handle and market the cantaloupes on which they have made loans are generally in a better position to protect their interests. By virtue of their contract with the grower it gives them an interest in the crop. It insures them a certain amount of business and it is to their interest to see that the crop is properly cared for and grown to maturity.

The amount of money loaned to individual growers by either the banks or distributing companies varies considerably, but the amounts generally do not exceed what is actually necessary for such items as seed, labor involved in such operations as cultivating, hoeing, irrigating, turning vines and other necessary labor before time of harvest.

**H. LOSSES INVOLVED IN PRODUCTION AND MARKETING
COSTS**

CHAPTER 37

LOSSES AT THE FARM

From the total number of cantaloupes produced on a given area, usually only a small percent are actually consumed. There is a great waste of melons on the farm, and of those shipped a large percent also becomes damaged and lost before they reach the final consumer.

A great many things can happen to a melon crop, even after it has reached the stage where it is about ready to be harvested, before it is placed on the market. Hail storms sometimes destroy large acreages. Sometimes fields become so badly infested with aphids that the fields are condemned by the inspectors and no melons are allowed to be shipped from these fields. Grasshoppers often do considerable damage to vines, and even to the mature melons. Plant diseases such as rust and blight often take a heavy toll, and in some sections mildew has caused enormous losses.

Even in normal fields there is always a large waste of melons. The poor shaped melons, the under-sized or over-sized, the poorly netted melons, those damaged by irrigation water or rain, or by sun scald, or by mechanical injuries, and those that become over-ripe are thrown out. Defective melons are generally left in the fields, but at each packing shed we find large piles of cull melons which have been discarded by the graders and packers.

The amount of waste on the farm varies with different

seasons and depends upon weather conditions, prevalence of disease or insect pests, and upon quality in general. Usually less than 50 percent of the total melons produced find their way into the market.

In 1928 approximately 12,000 acres were planted in the Arkansas Valley. A severe hail storm on the last day of August damaged the crop so that only about 9,000 acres were harvested. Of this 9,000 acres less than 50 percent were shipped so the percentage marketed that season was very low.

In 1926 the mildew damaged the Imperial Valley crop to such an extent that shipments were reduced by about 6,000 cars below what they normally would have been. Nearly every season there is more or less loss on the farm from a number of these causes. This makes cantaloupe production a very risky enterprise.

In the Arkansas Valley some use is made of the cull melons by feeding to stock, or in the case of those left in the fields, cattle or sheep pasture on them. However, used in this way they are not of a great deal of value.

CHAPTER 38

LOSSES IN TRANSIT

The losses in transit in late years have not been very much. Transportation facilities are so well organized and so efficiently handled that there is very little loss in transit. In former years there were times when large numbers of cantaloupes received at the markets were in such bad condition that they had to be dumped. Some of this might have been due to the fact that they were bad when put into the cars, but often they deteriorated while in transit. Since cantaloupe inspection, either State or Federal, has been put into effect in most of the large producing centers, there is less danger of bad melons being loaded into cars than when there was no inspection of any kind and shippers often took chances on shipping some very questionable quality and most of this would go entirely bad while in transit.

In Colorado where both State and Federal inspection has been in effect for several years, the quality shipped, while it could still be very greatly improved, has generally been very good, and there has been comparatively little loss in transit. Very few claims have been filed against the transportation companies.

Losses in transit vary with the different seasons. When the quality in general is good and there is good demand and good prices, there is usually less trouble with

losses in transit. However, when the quality is bad, especially if on account of coming from diseased fields, the melons will spoil much more rapidly and under such conditions there are more cars condemned at the markets and consequently a larger percent of claims will be filed against the transportation companies.

CHAPTER 39

LOSSES AT CONSUMING CENTERS

In our investigations relative to the amount of losses of cantaloupes which occur at the various phases of the industry from producer to consumer, we find that perhaps the most serious financial loss to the industry as a whole is brought about by the waste that occurs at the consuming centers. It is not only a loss of those melons which are wasted, but when large quantities are discarded at the market centers, it affects the prices offered for all cantaloupes sold on these markets. Whether these melons are condemned by authorities as being unfit for human consumption or rejected by the jobber, wholesaler, retailer or ultimate consumer, the general price for all cantaloupes is forced down all along the line and has its effect on the price to the producer.

The amount of loss at consuming centers varies considerably with the different seasons, and also at different times during a given season. This may be due to a combination of a number of factors, but is generally largely due to either poor quality or an over-supply in the markets.

In case the quality is generally poor throughout the season from some large producing section, the losses at the consuming centers are correspondingly great. In case of a large over-supply in several of the key markets there

will necessarily be much deterioration and waste which is always followed by a forced reduction in market price.

In 1926 the Imperial Valley crop was badly damaged by mildew and only a small percent of the crop was shipped to market. In spite of the under-supply the market price was relatively low. The melons which did reach the market were of inferior quality and consequently there was poor demand and an enormous waste of those that were sent to market.

During that season we had occasion to examine some of the Imperial Valley cantaloupes and we found them to be exceedingly poor in quality. In passing a display window of one of the large chain grocery stores, we noted a pyramid of Imperial Valley cantaloupes. We went in and asked permission to examine these, and were incidentally invited by the manager of the store to look over some additional melons in the back room. They had received that morning, from a jobber in Denver, a shipment of five standard crates containing 45 melons each. Three of these crates had been broken open and about 15 of the best melons from each crate had been placed in a pyramid in the display window. What was left of these three crates was considered as unfit to be offered for sale. The two unbroken crates were to be returned to the jobber because of the extremely poor quality found in the broken crates.

We selected from the pyramid two melons which we

thought were the two best melons in the entire shipment and found that only one of these was really fit to eat, and the flavor of this one was none too good. We noted that the melons in the pyramid sold very slowly, and about 50 percent finally had to be dumped. Less than 10 percent of this shipment of cantaloupes reached the consumer and no doubt most of those that did finally reach him were not eaten, or at least were not relished.

That large quantities of cantaloupes unfit for human consumption are constantly being shipped into our large market centers is evidenced by a statement made by the Federal Inspector of Fruits and Vegetables in New York City. "Thousands of people in New York each day purchase cantaloupes that are not fit to eat. The next time these folks go into the markets to buy they will take some other fruits instead of cantaloupes." This has a decided effect upon the consumptive demand for cantaloupes.

We interviewed a number of managers and operators of large restaurants and other eating houses in Washington, New York, Boston and Chicago, and we found that they discard from 10 to 20 percent of the cantaloupes they purchase for their trade. Retail fruit stands and grocery stores often lose large quantities by spoilage before they can dispose of them. The Federal Inspector of Fruits and Vegetables at Chicago stated that on an average/^{not}over 50 percent of the total number of cantaloupes shipped to Chicago

are actually consumed. He estimated that about 75 percent reach the consumer, but the consumer discards enough to make the total waste come to about 50 percent of what is shipped into the market.

Thus we have the great problem of heavy losses at consuming centers resulting from either shipping poor quality from the producing sections, or from an over-supply in our markets which cannot be properly absorbed and which results in spoilage and waste. This is one of the chief causes of low prices offered in the markets and it also means low prices to the producers.

I. CANTALOUPE SEED BREEDING

CHAPTER 40

IMPROVEMENT BY SEED SELECTION

The Rocky Ford district is well adapted to the production of seeds and there are opportunities for the improvement of many different kinds of seeds. Seed breeders have worked for many years on the improvement of cantaloupes and much progress has been made. The consuming trade, however, is continually looking for new developments which induces seed breeders to continue their efforts toward bringing out new varieties or superior strains of cantaloupes.

In 1922 Mr. Ben Wiley, an experienced cantaloupe grower of Rocky Ford, was engaged in the cantaloupe shipping business at Brawley, California. He took note of some early melons which were being delivered by a Japanese farmer by the name of Miyami. These melons were very irregular in size and type, but were good flavored and stood up well in shipping. They had the very desirable feature of being extremely early in maturity. Mr. Wiley obtained some seed of these melons which he sent to his father, who planted the seed the following year. The resultant crop matured about two weeks earlier than any other variety of melons grown here that season. They were, however, irregular in size, type, netting, ribbing and size of cavity. The color of the meat was largely orange with about 10 percent green and an occasional salmon tint. The vines were very

thrifty and seemed to be able to resist blight. The flavor was generally good; however, some individual melons were much more spicy than others. The shipping and keeping qualities were also good.

While there was extreme irregularity in size and type of these melons, there were three distinct types predominating. One was a very large, coarse, deeply ribbed melon with an extremely large cavity. It resembled somewhat the Montreal market muskmelon. This type was found mostly on the crown set and was among the first to mature. Another type was a jumbo size, oblong melon, well netted, but had distinct ribs. This type was also found mostly on the crown set and matured quite early. It was generally a very heavy melon with solid meat and small cavity. It had good flavor and good keeping qualities. The third type was a standard size melon, well covered with netting and had rather faint ribs. In appearance it resembled somewhat the Edward's Perfecto or the Pollock 10-25. This type was more convenient to pack than the other two, but it was late in maturity as it was found mostly on the second and third setting of fruit.

We made selections from this crop of cantaloupes, testing a number of individual melons for size of cavity, texture, color of meat, and especially flavor. There was a wide range of difference in all these characteristics. We finally selected one individual melon from the crown set

which had a combination of desirable characteristics. This was a jumbo size slightly oblong, well covered with netting, very distinct ribs, deep orange flesh, small cavity, and had a very sweet and spicy flavor.

The seed from this melon was planted in 1924 on our farm in the Holbrook district. The resultant crop again showed considerable variation in size and type. A large percent, however, was of the intermediate type, namely, a large, jumbo size, decidedly oblong, well netted with distinct ribs. There were a few of the extremely large, coarse, deeply ribbed melons, and a small percent of the smaller, round, solid netted type. The intermediate types were nearly all orange flesh and generally had very small cavities. Very few green meats showed up in this crop.

About 50 individual melons of the intermediate type were selected and each melon was closely examined and note taken of their general appearance as to size, type and netting. Each melon was cut, examined for size of cavity, color and texture of flesh and tested for flavor and eating qualities. From this lot four individual melons were chosen as having a combination of those desirable qualities for which we were selecting. The seed of each of these four melons was kept in separate containers.

In 1925 one row was planted on our Holbrook farm from each of these four melons. Again we had a great variation in size and type of melons in each of these individual rows.

No. 3 row, however, had a larger percent of the desirable type melons than the others, so we made selections from No. 3 row for our next year's plantings. About 100 melons of the intermediate type were selected and from this lot, after close examination for the desired qualities, we again chose four individuals which most nearly met the requirements.

In 1926 we planted four rows again, the seed from each melon to a row, on the farm of Mr. Dan Wiley near Rocky Ford. While there was again considerable variation in size and type of cantaloupes in these four rows, No. 2 row had practically none of the extremely large types and only about 20 percent of the small solid netted round round types. We picked 110 crown set melons of the intermediate type from 65 hills in No. 2 row. These were all cut and closely examined and tested for flavor and eating qualities. Out of this lot 14 individual melons were selected and seed from each was saved. The seed from these 14 individual melons was planted in 1927 on the farm of Mr. W. D. Roe at Newdale, Colorado. Forty hills of each individual were planted in rows in the center of the field and the border rows and ends were planted with stock seed which was saved from the balance of the 110 melons taken from row No. 2 the previous year.

This test again brought out a wide variation in types of cantaloupes from the different individual plots. However,

some of the extreme objections had apparently been eliminated. None of the plots showed any of the large deep ribbed types, and they all showed 100 percent orange flesh meats. By this time we were also able to note some improvement in the flavor of these melons. While it is difficult to establish any standard for flavor on account of the fact that people differ in their notions, yet in our selections we saved only those melons which had a decidedly sweet and spicy flavor.

We distributed a large number of melons from these plots to friends and visitors and then got their comments regarding the eating qualities. All agreed that these melons were of exceptionally fine quality. Sugar tests were made of representative melons taken from these plots as compared with melons taken from an adjoining field and they showed an average of 1.2 percent higher sugar content. The general conclusions drawn from the 1927 tests were that we had made considerable progress in establishing a more uniform type melon and also in improving the flavor. Seed was saved from 20 individual melons taken from 7 of the 14 plots. These were examined and tested as in previous years.

In 1928 the seed from these 20 individuals was planted in duplicate; one series on the farm of Mr. A. R. Bish west of Rocky Ford, and the other on the State Experiment Station east of Rocky Ford. The plots on Mr. Bish's

farm showed a wonderful set of melons. They were on good fertile soil and there were from three to five good type melons on the crown set of nearly every hill. A few of the plots showed as high as 90 percent of the type for which we had been selecting. Unfortunately this crop was badly damaged by hail on the 30th day of August which affected the quality to such extent that flavor comparisons could not be made. The plots on the Experiment Station were slightly hit by hail, but we were able to make some flavor determinations from these. Sixteen individuals were saved and these were again planted on the Experiment Station in 1929.

Border plantings in both the 1928 and 1929 tests were from stock seed selected from the plots the previous years. This seed was from those melons which were true to type with small cavities and the desired color and texture of flesh.

From this work we are able to conclude that cantaloupes respond quite readily to seed selection. It demonstrated that it is possible to bring about improvements, uniformity of size, type, color of flesh, texture, size of cavity, flavor and eating qualities. The matter of improving the flavor is what prompted us to undertake this project. We noted that breeders were generally selecting for size, type, uniformity, netting, size of cavity and color of flesh, but none of them were making any efforts toward the improvement

of flavor.

J. SUMMARY AND CONCLUSION

SUMMARY

The Rocky Ford district was the first district in the United States where cantaloupes were produced on a commercial scale. The soil and climate were found to be ideal, and when grown under irrigation, cantaloupes of exceptionally fine quality and of high yields could be produced.

In the early history of this industry there were some difficulties to overcome. Varieties and types had to be established. Markets had to be found. Methods of packing and shipping had to be devised and standard containers had to be perfected. It was also necessary to properly organize the transportation and distribution of this highly perishable product.

After the industry had been well established in the Rocky Ford district, and a demand had been created in the market centers, other irrigated sections of the southwest entered into the production of this crop. The greater consumptive demands of the year shifted from the autumn months to the early part of the season. This favored those sections where cantaloupes could be grown and brought to maturity early in the season. The Imperial Valley of California is especially favored in this respect and has become the largest as well as the earliest cantaloupe producing section in the United States.

At present there are a large number of districts in all parts of the United States producing commercial

cantaloupes. Most of these districts come into the markets during the spring and summer months and the consumers are pretty well "fed up" on cantaloupes by the time the Rocky Ford crop is ready for market.

The market gardeners and truck farmers near many of our large cities are now producing cantaloupes which are sent to the nearby markets by motor truck. These melons come in competition with those shipped in from distant producing sections. The trend in many sections is toward increased production by market gardeners near the large market centers.

In the early history of the cantaloupe production in the Arkansas Valley, the growers were not much concerned with soil fertility problems. Plant diseases and insect pests were not serious. In late years, however, a great many soil problems have developed and plant diseases and insect pests often prove disastrous to a melon crop. These factors have added materially to the hazards involved in cantaloupe production.

At the time when cantaloupes were first introduced in this section, the matter of crop rotations did not give the growers much concern. As time went on, however, it became necessary to rotate crops in order to get profitable yields not only of cantaloupes but of all crops. A large number of different kinds of crops have since been introduced and good systems of crop rotations are being gener-

ally followed. Many of the new crops have proven to be well adapted to this section and can be used as substitute crops for cantaloupes.

Transportation is an important factor in the cantaloupe industry. Long distance from markets and high transportation costs are serious handicaps to the Arkansas Valley district. The large consumption centers are located in the industrial sections of the East, and the motor truck and paved roads have made possible the supplying of these markets from nearby favorable producing sections at the time of the year that the Arkansas Valley crop comes onto these markets.

The necessity of good seed induced a number of men during the early years of cantaloupe production in the Rocky Ford district to work on the improvement of cantaloupes by seed breeding and seed selection. This led to the production of other classes of seeds in this district, particularly all kinds of vine seeds. As a result of this work Rocky Ford has become the greatest vine seed producing section of the United States.

The conditions in this district for the production of vine seeds are very favorable and cantaloupe seed production bids fair to continue as an important industry in this section.

CONCLUSIONS

It is impossible to make any definite predictions as to the trend of the cantaloupe industry in the Arkansas Valley. However, from our investigations we may be able to draw some conclusions as to the possible trend.

In our opinion there are no indications which would justify an expansion of the industry due to the handicaps herein mentioned, chiefly, long distance from market; high transportation costs; too much competition with other producing sections and decreased consumptive demands at the time when the crop in this valley comes to maturity. On the other hand, cantaloupes no doubt will be grown in this valley to some extent for many years to come. The crop has a rather definite place in our rotation system and soil and climatic conditions are still favorable; the industry is well established and there are investments in equipments, in loading sheds, and in icing and transportation facilities. A certain class of growers are well adapted to the production of cantaloupes, having grown them for years, and they understand how to produce them successfully.

The production of cantaloupes has in most seasons been profitable to some growers, and while there have been poor as well as good seasons, yet the conservative growers have in the past generally made a small profit over a term of years.

Thus we may conclude that while there are great

hazards and serious handicaps involved in the production of cantaloupes in this district, yet there is reason to believe that the industry will continue and that there should be a limited conservative acreage grown in this section in future years.

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1. Flowing for cantaloupes with two way plow.



2. Irrigating cantaloupes.



3. A field of cantaloupes in early stage of growth. Turlock, California.



4. A field of cantaloupes furrowed for irrigation. Turlock, California.



5. A good field of cantaloupes. Rocky Ford,
Colorado.



6. Cantaloupes grown on south slope of beds.
Imperial Valley, California. Note deep
irrigation furrow.



7. Cantaloupe breeding. Peppers Fruit Company
and California Experiment Station cooperating.
Imperial Valley, California.



8. Harvesting cantaloupes, Rocky Ford, Colorado.



9. Harvesting cantaloupes, Rocky Ford, Colorado.



10. Field superintendent inspecting cantaloupes
Imperial Valley, California.



11. Field packing shed. Rocky Ford, Colorado.



12. Field packing shed. Rocky Ford, Colorado.

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13. Packing cantaloupes at field shed.



14. Hauling cantaloupes by truck to shipping shed.
Rocky Ford district.



15. Shipping cantaloupes at Swink, Colorado.



16. Unloading cantaloupes from truck to shipping shed. Rocky Ford district.



17. Federal inspector examining cantaloupes at shipping point. Rocky Ford district.



18. Federal inspector making sugar test of cantaloupes at shipping point. Rocky Ford district.



19. End view of cantaloupe crates loaded inside of refrigerator car.



20. Honey Dew melons in refrigerator car showing bracing at car door.



21. Refrigerator cars loaded with cantaloupes.

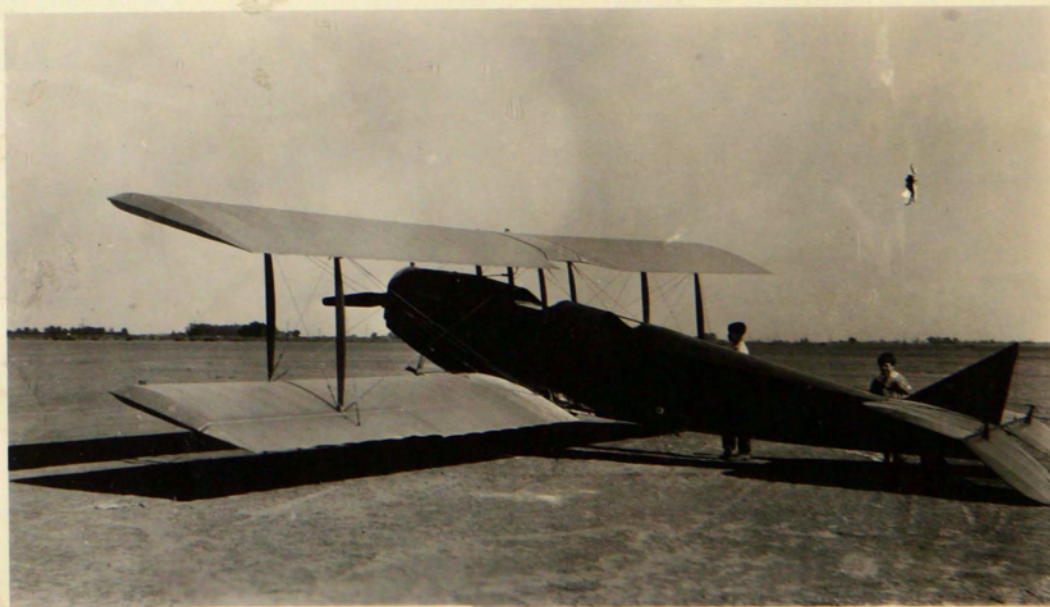


22. Series of cantaloupe packing and shipping sheds at Brawley. Imperial Valley, California.

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23. S. A. Gerard and Company office, packing and shipping shed at Brawley, California.



24. Airplanes used in dusting cantaloupe fields with sulphur to control mildew. Imperial Valley, California.



25. Icing station on Southern Pacific Railway.
Yuma, Arizona.



26. Icing platform one mile long on Southern
Pacific Railway. Yuma, Arizona.



27. Cantaloupes shipped by express. Rocky Ford, Colorado.



28. Refrigerator cars on sidetrack in readiness for cantaloupe shipments.



29. Hot caps to protect young cantaloupe plants from frost and other injury in early spring.



30. Seed distributing office of Garwood and Woodside at Rocky Ford. This firm distributes from 50 to 60 thousand pounds of melon seeds annually.



31. Harvesting and piling cantaloupes to be cut for seed.



32. Cutting cantaloupes for seed by knife attached to the stool. Seed is scraped out into bucket.



33. This variation in type of melons generally found in the Miyani or H. B. variety in 1923.



34. This shows the type after five years of breeding and selection.



35. Desert land in the Salt River Valley, Arizona,
when put under irrigation produces wonderful
cantaloupes and other special products.



36. This cantaloupe, which was greatly relished by the young lady, was the individual melon selected in 1923 as being an ideal melon to use in our seed breeding work. It had the following desirable characteristics: Jumbo size, slightly oblong, well netted, distinct ribs, small cavity, deep orange flesh, fine texture, and delicious spicy flavor. Seed from this melon was used as the foundation stock in our seed breeding project.