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Middle Eastern Citrus Industries and Their Markets

Abstract

The history of Citrus Fruits¹ presents an intriguing subject to its student, having symbolized at various places and times Love, Orgies, Political Intrigue, Gods and Religious Lore. Citrus holds an honored place in the graphic and literal arts of many peoples. It has been used, among other things, as a poison, a cleansing agent, a perfume, a condiment, a panacea for all physical illness including snake bite and the Plague, a prized food for kings over the centuries, and only recently it has come to be recognized as a necessary and readily accessible food for the masses.

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MIDDLE EASTERN CITRUS
INDUSTRIES AND THEIR MARKETS

by
Daniel Garnick

A Thesis
submitted in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

The Dropsie College
for Hebrew and Cognate Learning
Philadelphia
1958

A P P R O V A L

This dissertation, entitled

MIDDLE EASTERN CITRUS
INDUSTRIES AND THEIR MARKETS

by

Daniel Garnick

Candidate for the degree of
Doctor of Philosophy

has been read and approved by

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Josh Plinar

Don Peretz (with reservations submitted separately)

Date May 15, 1958

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Chapter I

1. HISTORY OF THE INTRODUCTION OF CITRICULTURE TO THE MIDDLE EAST

The history of Citrus Fruits¹ presents an intriguing subject to its student, having symbolized at various places and times Love, Orgies, Political Intrigue, Gods and Religious Lore. Citrus holds an honored place in the graphic and literal arts of many peoples. It has been used, among other things, as a poison, a cleansing agent, a perfume, a condiment, a panacea for all physical illness including snake bite and The Plague, a prized food for kings over the centuries, and only recently it has come to be recognized as a necessary and readily accessible food for the masses.

The origin of this genus, has been fixed in the South

¹This section is largely dependent upon S. Tolkowsky, Hesperides A History of the Culture and Use of Citrus Fruits, Staples and Staples Limited, London 1938. This volume is certainly the most exhaustive work on the History of Citrus to date. Also utilized in this section, the first volume of the comprehensive work edited by H. J. Webber and L. D. Batchelor, The Citrus Industry, University of Calif. Press 1943. Immanuel Low, Die Flora Der Juden R. Lowit Verlag, Vienna, 1924, was consulted for his careful documentations and arguments on the aspect of the citron in Jewish History and Traditions; as was also the Mikraoth Gadoloth, Mishna, Targum and Christian Commentary, such as the Cambridge Bible and International Critical Commentary.

and Eastern sections of Asia and the Malayan Archipelago. References to it have been found as far back as perhaps the 12th Century B.C.E. in what is today China. It is fairly certain that the citron and orange originated in China while the lemon may be of Chinese or Indian origin, and the lime, shaddock (Adam's Apple) and grapefruit are thought to be products of Malaya.

It is probable according to Tolkowsky that the citron was acclimatized in Persia no later than during the first half of the first millenium B.C.E. Furthermore, he argues, it could not have been cultivated in Mesopotamia prior to 300 B.C.E. Thus denying the assertions of previous researchers that the Jews were introduced to the citron during the Babylonian Exile. It was after the conquest of western Asia by Alexander the Great that the culture of the citron spread to the Mediterranean World-the Levant, North Africa, Greece and Italy. This spread became fairly rapid after the adoption by the Jews of the ethrog (citron) for ritual purposes during Succoth (Feast of Booths). The adoption of the citron, Tolkowsky hypothesizes, occurred during the middle of the 2nd Century B.C.E. under the reign of Simon the Hasmonean when the

cedar cone¹ was displaced by it. The cedar cone was connected, in the minds of those who had come into contact with Hellenistic influences, with the Rites of Bacchus or Dionysus and hence was no longer a fit object for the Jewish ritual.² For those who would argue that the injunction in Leviticus to take Peri Etz Hadar (fruit of the Citrus tree) proves an earlier acquaintance with the citron,³ Tolkowsky suggests that this injunction (1) could have been included at a later date, or (2) should be read Peri Etz Ha-Dar (fruit of the Dar Tree), thus alluding to a well known Dar or "Dividdar" tree of India, widely accepted as an holy cedar, or (3) can simply be read as "fruit of a goodly tree" which is the usual translation and has nothing at all to do with any particular specie.⁴ Tolkowsky here denies a very strong tradition among the Jews: the identification of ethrog and peri etz hadar. Thus, Ramban comments on the

¹The genus citrus receives its name from the Greek kedros or cedar with which it was originally confused.

²But Low cites the following, which should also preclude the citron as symbol if this argument is followed, "Der Feststrauss selbst hat seine Analogien auch in heidnischen Kreisen (...in den Oschophoria, den in der Hand aus dem Tempel des Bacchus in den der Athene getragenen weinranken unde im Thyrsos...)" op. cit. Vol. III, p. 286

³Leviticus, XXIII. 40

⁴Tolkowsky, op. cit. pp. 49 - 57

Injunction in Leviticus that hadar and ethrog are the same, the former is Hebrew while the latter is Aramaic. However, the root for the word ethrog is not originally Semitic but Persian.¹ The Targum notes also this identification; however, it has been demonstrated that later scribes have made inclusions in the Targum and this source is therefore disqualified even though the main body of it had been completed by 300 B.C.E.

Miraculous stories grew up among Jews and early Christians concerning the identity of hadar and ethrog.² An Agada tells of the ethrog being the last of the fruits from the Garden of Eden; another states that this was really the fruit with which Eve tempted Adam. In the thirteenth century C.E. Eleazar of Worms noted the identity by finding a numerical value of 659 for פרי עץ הדור as well as אטרונג Rashi speaks of the marvelous taste of the ethrog and Theophrastus marvels at its fragrance, while Tshirch marvels that it is always blooming and bearing fruits. Because of its everblooming and bearing characteristics an Agada relates that Rabbi Jehuda I, the compiler of the Mishna, said that it was called Hadar

¹Jacob Levy, Neuhebraisches und Chaldaisches Worterbuch, Vol. I F.A. Brockhaus, Leipzig, 1876, p. 186. From the Persian Turunj changed in Arabic to Atrunj or Utrunj to Ethrog in Hebrew.

²Quoted and enumerated in Low, op. cit, pp. 285 -315

since it referred to dir, a word connoting household or herd, in so far as the fruits on the tree could be found in all sizes from walnut to a grapefruit even as the family holds all sizes and maturity levels. Ben Azzai follows the tradition that etz hadar is unlike any ordinary tree in that not only the roots but the very limbs of the tree withdraw water, and that the fruit if not picked could stay on the tree without falling for years.

On the other side of the ledger, the Karaites, a Jewish sect, have ignored these traditions and opposed the identity of hadar and ethrog.¹ Johann Jahn, the Viennese authority on biblical archaeology questions the identification, and asks, why the citron doesn't have a generic (eigenen) name as the other biblical species and why such a circumlocutious term (Umschreibung) is used as hadar was a preferred tradition only since the Mishnaic period, and that after Alexander the Great's entry into Media was the secret of this fruit learned and spread to the East Mediterranean. Similarly, Walter T. Swingle writes that the citron first came to the attention of the the ancient Greeks and Romans in Media.² The question

¹ibid

²The Standard Cyclopedia of Horticulture, MacMillan Co. N.Y. 1927

grows when it is observed that in Nehemia VIII. 15, similar species to those mentioned in Leviticus are enumerated with exception of Hadar. Thus, in the period immediately following the Babylonian Exile, during which period it was thought that the ethrog had been introduced, there is no mention made of a remotely related specie. This in itself proves nothing, but it continues to cause wonder and some support to the thesis that the citron was introduced in the later period of Alexander. In the Mosad Bialik edition of the Mishna, Hanoch Albeck, a Mishnaic scholar of repute, expresses this wonder when writing an introduction to M'sechet Sukkah. The problem then as to the identity of ethrog and hadar, and therefore the approximate date of introduction of the citron to the Mediterranean area is not solved, although it continues to elicit responses. Most recent writings tend to favor the belief that it followed Alexander rather than the Traditional Jewish belief or the writings of earlier historians connecting its introduction to the Babylonian Exile.

However, it is known because of writings of Josephus, Theophrastus and others of the period during the Second Jewish Commonwealth that at least immediately prior to the rise of Christianity, the citron was in demand in the Middle East and Mediterranean areas for purposes of

ornament and ritual.¹ But for the next few centuries, the medicinal powers attributed to the citron was the main reason for its demand. It was recommended for the alleviation of sundry illnesses, such as gout, coughing, stomach upset, also in combination with other substances serving as a laxative, curing halitosis, even preventing clothes from being eaten by moths. While it is agreed that the citron was known during the period of Roman hegemony over the Levant, most authorities argue that other varieties of citrus were yet unknown. Tolkowsky on the other hand, argues that the Romans came into contact with the lemon and sour orange when they discovered the Arab route to India from the Red Sea. Webber argues against Tolkowsky's assertion, noting that there is no suggestion in the literature of the Romans of any variety resembling the lemon or sour orange. In so far as the Romans were known to delight in new gustatory treats, they would probably have specifically mentioned these exotic fruits.

Webber further asserts that prior to the barbaric invasions of Rome circa 350 C.E. lemons and sour oranges weren't cultivated in the territory of the Roman Empire

¹Low, op. cit, pp. 285 - 315

77

nor in its area of commerce. The probability is that cultivation of these fruits didn't extend west of the Indies or perhaps the Ganges.

At any rate, authorities agree that by the tenth century, sour oranges and lemons were cultivated in the Middle Eastern lands.

The first mention of the shaddock or adam's apple in the Middle East is recorded in Palestine by the thirteenth century bishop and historian, Jacques de Vitry in his History of Jerusalem.

Again controversy rages in discussion of when the sweet orange was introduced to the Mediterranean area. However, there was no reference to any such variety prior to the fifteenth century. The unresolved question here is, did the fruit come by the same route that the citron, sour orange and lemon took or was it introduced by the Portuguese after they reached China. Much of the argument here is concerned with the rendering of translations of documents which themselves are liable to question. The Portuguese did however, contribute to the popularization of the sweet orange and did introduce a superior variety. Thus, one of the more common appellations of the sweet orange in Arabic is burtugan or burtugal (Portugal).

The lime was first described in literature by a thirteenth century Arab, Abd al Latif. It is thought that this variety reached the Middle East through India and Persia at about the same time as the sour orange and lemon.

The mandarin orange was known and extensively planted in China and Japan at an early date but was not seriously cultivated in the Middle East until recently. The major producers of these fruits in the Mediterranean region, today, are the North African countries.

The grapefruit is probably a mutation of the shaddock and interestingly was first noticed at the end of the seventeenth century in the West Indies, where in its parent form it was introduced by the early Spanish colonists. Although it is now grown in several varieties in most citrus regions, Israel is the most important producer in the entire Mediterranean and Middle Eastern areas.

2. Physical Characteristics

Citrus trees bearing commercially tend to vary in height between 15 to 40 feet, usually thorny with a dense evergreen foliage, producing many small and mainly white flowers. The flowers are characterized by abundant nectar, therefore making citrus areas valuable also for honey-production, orange blossom honey being prized and

more expensive than the usual buckwheat or clover honey.

The blooming period in the Mediterranean and Middle East areas usually comes in Spring and lasts for about 6 weeks. Blooming may come earlier if there is a warm period during the winter. This may have dangerous consequences if a late frost then develops. The lemon and the lime, however, bloom somewhat continuously, therefore providing frequently a summer as well as a winter crop, "although principally its blooms are in the same period of the orange blooms," in the aforementioned areas.¹

Normally, late fall and winter are the periods for ripening of most citrus fruits. However, varieties have been developed, the fruit of which are "early or late ripening," thereby permitting different varieties to ripen over a period of 9 months a year in any one area.

The age of citrus trees under cultivation generally doesn't extend much over a hundred years. The tree tends to lose greatly in productivity, after it reaches 30-40 years of age, and for this reason commercial groves rarely operate with trees beyond that age. In the Middle East, the average productive longevity of trees in commercial groves ranges between 25-30 years.

¹M. Zagorodsky, Sefer Hapardesim (Hebrew), Tel Aviv 1928, Vol. 1, P. 38

Chapter 11

Physical Requirements of Citriculture and Conditions in the Middle East¹

The genus citrus originated in a habitat which had an abundance of moisture, rich soil, protection from direct exposure to the sun either by the shade of taller trees or high atmospheric relative humidity (i.e., the ratio of the quantity of vapor actually present in the air to the greatest amount possible at a given temperature) which off set the dessicating effect of the sun, plus warm temperatures.

The ability of citrus to endure unoptimal physical conditions currently varies from variety to variety and from physical region to physical region.

Generally, dormancy in the citrus tree occurs below a temperature of about 55°F. The minimum endurance temperature is at freezing although no great damage is likely

¹This section has drawn from the works of recognized geographers, soil chemists and weather specialists. The works most heavily relied upon are as follows;

H. Webber and L. Batchelor, op. cit. Vol. 1.

W. B. Fisher, The Middle East, A Physical, Social and Regional Geography, Dutton, N. Y. 1950

Y. Paporish, Artzoth Ha Mizrah Ha Tichon, (Hebrew) Tel Aviv, 1952

A. Reifenberg, The Soils of Palestine, Murby and Co. London 1947

W.B. Kelly, Alkali Soils, Reinhold, Ny. 1951

C. Millar and L. Turk, The fundamentals of Soil Science, Wiley and Sons, N.Y. 1951

to occur unless the temperature goes below 28°F. for a period of several hours. Maximum endurance temperatures are not ordinarily reached in most citrus sections, hence injury to trees occur at high temperatures, usually, in combination with high winds and/or extremely dry weather conditions (not lack of rain so much as low atmospheric relative humidity, since the deficiency of rain is more readily overcome by irrigation than is the deficiency in atmospheric humidity).

While the various species of citrus may be grown successfully on a wide range of soil types, since deficiencies in nutritive qualities of the soil can be remedied by artificial fertilizers, good textured soils (fine loams) and freedom from alkali conditions (and salts introduced through irrigation waters) are the most important elements as to the soil requirements of citriculture.

The problem of equable flow of water from the roots to the leaves is faced by the citrus tree as well as all other trees. Since most commercial cultivation of citrus occurs in regions where there is a sharp deficiency of rainfall, irrigation is required. The waters for the irrigation of citrus must be sweet since citrus is especially sensitive to saline conditions.

The vital physical factors affecting citriculture, such as temperatures, rainfall and soil have been shown to be interrelated with certain soils tending to be characteristic of certain climates. Lang's Rain Factor Formula attempts to categorize soil types on the basis of rainfall and temperature.¹ A. Reifenberg has utilized this formula in classification of the soil types of Palestine. Because of climatic similarities over much of the Middle East, this classification can be extended to include much of the area of the other states in this region. Thus an arid climate is the result of a 0 - 15 rain factor, semi-arid, 15 - 30, semi-humid, 30 - 50 and humid over 50. The following is a brief description of soil types under the climatic regimes of the Middle East. It will be noted that many of the soils which fall into the categories of Middle East climates represent a limiting factor for citriculture in the area. The arid climate prevails in much of Egypt, Saudi Arabia, Jordan, Iraq, south east Syria, the Negev of Israel and in central Turkey. The soils of this climatic region, originally alluvial deposits, have become over the ages desiccated and saline. These soils are also frequently

²To obtain a rain factor, total rainfall in millimeters is divided by average temperature, in degrees centigrade, during the rainy season.

low in organic and essential mineral content, so that active cultivation in much of these places is not possible without quantities of non-saline waters and the addition of organic and mineral fertilizers. Citriculture is not practiced in most of the area of the arid climate, but in the semi-arid and semi-humid climates of the Middle East.

The semi-arid climate prevails in the area paralleling the Mediterranean coastal plains of the Middle East including also north and west Syria.

Mediterranean steppe soils predominate in the semi-arid climatic regime. They are brownish loamy soils, quite fertile when given a sufficient water supply for irrigation. Dune Sands are also frequent. These are predominantly sandy, but contain some quantities of salt and clay. Because of their high porosity they are generally free of salinity. These sands are mobile because of lightness and can overwhelm productive land. There is, therefore, a need to "fix" them. Israel has been attempting to contain these dunes by planting various species of grass and tamarisk on them. They can also be anchored by trees. Thus citrus fruit trees have been cultivated on some of these dunes in Israel where non-saline water has been available.

The semi-humid climate prevails in the coastal plains of Lebanon and coastal regions of Israel. In these two states most of the commercial citriculture in the Middle East occurs.

A variety of soil types occur in the semi-humid climate, frequently red and brown earth similar to "Terra-Rosa" which is a Humid Climate type. Under conditions of almost Humid Climate, rain followed by thorough going drought and great heat, these soils may form a hard and sometimes thick crust. Thus, in the Saïda region of Lebanon a 'pan' thirteen feet thick of chalky soils exists, while the 'Nazzaz' in Israel is a thinner pan of red, sandy soil. This 'pan' is continuous over many miles in the Judean and Syrian mountains. These 'pans' prohibit generally the growth of anything but shallow rooted plants, such as cereals. Where on these soils, orchards have been grown, it is certain that the cultivator underwent considerable effort to provide a break-through to the sub-soil for each tree.¹

Other soil types such as alluvial soils appear over areas

¹These pans provide an additional limiting factor to citriculture in that there are serious problems of drainage in connection with irrigation.

of the Middle East, however, although there is frequently a rich humus content to these soils of which there is a marked deficiency in all other soils in the area. Trees do not grow well.

One of the more limiting factors to citrus cultivation in the Middle East arid and semi-arid climatic regimes lies in the sensitivity of citrus to alkali soils. Over large sections of the Middle East salt beds are apparent; this condition has resulted from the leaching effect of the warm temperatures and the dearth of rain. A capillary attraction is thereby created, whereby subsurface moisture is drawn back to the surface. This upward transfer of soil water may result in the upward shift of minerals including salts which then tend to accumulate near the surface. The commonness of this condition led to the coining of the term alkali, a word of Arabic origin, from al-gill (the ashes of the saltwort plant) in so far as the soil surface with its stretches of salt accumulations looked like white ashes to the beduin.

Alkali conditions have occurred for other reasons in some of the older irrigated regions of the world. These conditions prevail in Egypt and Iraq and serve to limit their expansion of citriculture. Soil chemists have pointed out

the alarming advance of alkali soils in Egypt with the further development of perennial irrigation. The over-irrigating of soils in Egypt, particularly, coupled with poor drainage¹ seems to have given rise to a chemical action in the soils resulting in salt formations.

In Israel and Cyprus increasing salts have occurred in the soils owing to the intrusion of sea water into ground wells. This has resulted from unduly lowering the water table in areas which have over utilized the available sweet waters.

The high salinity of much of the ground water in the Middle East prohibits citriculture in regions so affected. Water is, of course, of primary importance in controlling root formation and development, aiding in the assimilation of food and other materials, keeping the cells turgid, breaking down the soil humus and making it available for absorption, and in keeping the soil cool through evaporation.

¹ Poor drainage prevents, also, soil aeration which contributes to root growth. Thus, the over abundance of water in irrigated soils prohibits a healthy citriculture

In a macro-examination of the hydrological sources of the Middle East it should be noted that rivers abundant with water which flow throughout all the months of the year are few.¹ There are three principal rivers: the Nile whose sources are in equatorial Africa, the hills of which receive the monsoon rains; and the Tigris and Euphrates whose sources lie in the "melting snows of Turkey's mountainous interior".² Smaller rivers in Israel, Jordan, and Lebanon are utilized for irrigation but have not had great significance for citriculture. Much of citriculture in the area depends on irrigation from springs and ground wells with the exception of Iraq and Egypt. During the rainy season there are many rivers and streams which flow, albeit tumultuously, temporarily. When the short season of rain is over these "nahalei haachzav" (deceptive streams) quickly become dry wadis showing no trace of their former watery nature except in course, as the waters rapidly percolate down through the sandy soils or evaporate under radiant skies and blazing heat. The short rainy season alluded to above is typical of the Mediterranean climate. Most citrus in the Middle East

¹Paporish, op. cit. p. 29

²R.I.I.A. The Middle East, p. 507, Oxford University Press. Ny. 1954

will be found in the area answering to the description of the Mediterranean Climate. This includes the coast of Israel, Lebanon, Syria and Turkey and is primarily characterized by long hot and dry summers and short, wet and cool to cold winters. In the Desert Climate of Egypt, the summers are hotter and winters frequently colder, while there is little or no rain. Important areas of citrus will also be found in the subtropical region of the Jordan Valley, the Caspian littoral of Iran, the Black Sea littoral of Turkey, and central Zagros of Iran - each of which is characterized by its own climate. Also, generally the rainfall tends to be heaviest North along the Mediterranean Coast diminishing to the South and West, diminishing to the East in the interior. While the rainfall is more substantial in many citrus areas of the Middle East than comparable citrus areas in the U.S., irrigation is an absolute requisite for all commercial cultivation of citrus in the Middle East also, in so far as the rainfall tends to be concentrated during the winter months when the fruit is maturing rather than spread evenly over the year to include the blooming and budding seasons as well as to offset the transpiration of the trees during the dry season.

J.H. Burke in three separate studies of the citrus exporting countries of the Middle East, Israel, Lebanon and Cyprus has prepared monthly climate tables of some representative citrus districts. Based on these Israel shows an average range of 3-6 inches of rainfall per month from November through February and an average range of 0-1 inch per month from March through October. Lebanon shows an average range of 3-8 inches of rainfall per month from December through March, and 0-1 inches per month from April through November. Cyprus's range of rainfall per month is 2-5 inches from November through February and 0-1 inch from March through October.¹

Aside from the short rainy season, there is the tremendous variation from year to year in total inches of rainfall to be considered. Thus from 1920-1932, W.B. Fisher cites a range of 13-37 inches of rainfall in a citrus

¹ J.H. Burke, Recent changes in the Citrus Industry of Israel, F.A.R. No. 62 U.S.D.A. Wash. D.C. July 1951, p. 5
 J.H. Burke, A Study of the Citrus Industry of Lebanon, F.A.R. no. 58, U.S.D.A. Wash. D.C. May 1951, p. 5
 J. G. Burke, Observations on the Citrus Industry of Cyprus, F.A.R., U.S.D.A., Wash. D.C. April 1951, p. 3

district in Lebanon.¹ The average annual rainfall for this district is 24 inches, but the range shows the necessity for more or less irrigation in any given year.

Middle East citrus regions largely with the exception of Turkey are more fortunate than most other commercial areas in that they are relatively free from frost. J. H. Burke in the studies cited shows a range of from 55° F. to 80° F in average temperatures throughout the year in representative citrus Districts of Israel with an absolute minimum of 36° to an absolute maximum of 115 degrees F. Lebanon is not quite as protected as Israel from very cold temperatures but is still more fortunate than Spain and Italy, the major Mediterranean citrus exporters. In a representative citrus district of Lebanon the average range of temperatures ran from 43 degrees F. to a maximum of 98 degrees F. Cyprus's representative citrus areas show a closer similarity in temperature range to Israel rather than to Lebanon.

At the higher temperature range there is a tendency for fruit droppage to occur, but the high atmospheric relative humidity of Israel, Lebanon and Cyprus's citrus areas helps to sustain the fruits on the trees.

¹W.B. Fisher, op. cit. p. 51

Atmospheric humidity plays a further role in producing a more juicy fruit. The higher the humidity, generally the greater the regularity of the configuration of the fruit and the smoother the skin. Shade helps to provide greater humidity. However, only Iraqi citriculturists have the advantage of shade in the Middle East, in so far as the citrus trees are generally grown under date palms. The Iraqi practice of planting under date palms, also provides for sheltering of the citrus trees from winds. Egypt and Cyprus tend to surround their citrus groves with trees (usually cypress) to provide windbreaks.

Cold winds, sometimes whip in from the sea and contribute some danger to citrus in the coastal strips because of the low resistance of trees to frost in this area. Hot winds from the desert (Khamsin) sometimes cause dessication of leaves and fruit droppage in the Middle East.

All in all, it can be said, however, that winds, hot or cold, constitute less of a hazard to Middle East citriculture than to other commercial citrus areas, and that citrus is well suited for much of the Middle East climatewise, but is most limited in expansion by soil conditions in combination with the availability of sweet water.

Chapter III

MIDDLE EAST CITRICULTURE AND HARVESTING PRACTICES¹

The classic pattern of Mediterranean cultivation, dense planting of trees and hand cultivation, prevails in most of the Middle East rather than the mechanization and further spaced planting which typifies U.S. Citriculture. This can be explained in terms of the relative price of the factors of production. While in the U.S. there is a scarcity of labor and relative abundance of land and capital, the opposite scarcity of land and capital and abundance of labor characterizes the Middle East and for that matter most of the citricultural regions of the entire Mediterranean area.

The pattern of citriculture in Palestine (pre-State, before 1948) closely approximated the present pattern in Lebanon and Cyprus. This pattern consisted of

¹In this chapter, as well as most following, the greater emphasis will be placed on Israel rather than her Middle East neighbors. Israel is the most important Middle East exporter of citrus and has developed a much more intensive study and literature of the subject than her neighbors, some of whom publish little if any details on the state of the citrus industry. It therefore follows that there will be a greater emphasis on Israel, if not only because of the greater role which she plays in citrus trade, certainly because of the dearth of information on citrus in many of the neighboring states.

planting up to 80 orange trees per dunam, frequent hoeing and digging before and following irrigation, basin irrigation through a network of open concrete flumes, hand application of large amounts of organic manures and hand picking, often by women and children.

The disadvantages of this system are manifold. The dense planting encouraged heaviest growth of fruit on the uppermost branches and tops of trees. This made the fruit more inaccessible to pickers and therefore increased the cost of picking. Israeli citrus experts believe that the density of trees doesn't permit a high enough growth of fruit per tree and that much more fruit per tree could be grown on trees which are spaced further apart. There is also a greater frequency of citrus diseases and pests because of closer contact of fruit and foliage between trees in the dense planting scheme. The pests and diseases are more difficult to control in dense plantings in so far as they are more inaccessible in the dense growth. Fungus and rotting of roots is attributed to basin irrigation.

No major changes took place in citriculture in Palestine even though orchardists were already aware of the disadvantages of the old pattern in the 1920's. Prices

were good up to the middle of the 1930's, but afterwards prices declined while costs remained firm. No market worthy of mention was available to Palestine orchardists during World War II and therefore changes in the pattern of citriculture didn't occur then except to reduce cultivation to its barest minimum. The post war period was mainly devoted to bringing back into bearing, groves which had been neglected. The Arab-Israeli War of 1948-49 caused the abandoning and ruin of more than one half of Palestinian citrus acreage.

|| British policy

With the establishment of the State of Israel, the shortage of cheap labor (the vast majority of Arabs had fled Israel and were replaced by more expensive and inexperienced Jews) and the desire to rehabilitate abandoned groves necessitated the mechanizing of citriculture.

Thus with the large contiguous areas of abandoned groves (hundreds of acres) marked for rehabilitation, the scheme of the quasi-governmental Citrus Control and Marketing Boards and the availability of large loans from the government, the new pattern rapidly emerged. Now, the system of sparse planting, sprinkler irrigation, mechanical cultivation, picking and part mechanical packing is rapidly emerging and promises to become the prevalent system in the near future in Israel and to a lesser degree in Cyprus.

GROVE SIZE

The structure of groves in Israel presents, today, a study of contrasts. With the resumption of planting in 1952, the new approach tended increasingly to become a reality. Permanent teams of technicians and workers, centralized packing houses, scientific water consumption and rational mechanization were applied in planning new plantations. These concepts conflicted with the earlier ideal of family groves, the majority of which comprised 5-10 dunams each cultivated as separate economic units. The newer approach calling for greater systematization and economies of scale, needed much larger units of operation, if not ownership.

Thus, in new grove developments, plantations, according to the tract of land being developed would consist of hundreds, if not thousands of dunams. In the older groves, a movement is also developing to organize the many small groves into larger units of operation and development of centralized packing houses.¹

As of 1953, of approximately 4200 Jewish owned groves in Israel, 47% of the groves were under 10 dunams in size, 27% were between 10-20 dunams, 14% between 20-40

¹B. Gurstein, "A new Approach to Plantation Planning," Israel Export Journal, May 1956, p. 39.

dunams and only 12% above 40 dunams.¹ However, the groves under 40 dunams constituted about 50% of the area devoted to citriculture, and it is expected by the Ministry of Agriculture of Israel that the small sized groves will continue to diminish as a fraction of total citriculture or will consist only as units of ownership while larger groves and larger units of grove operation will become increasingly the predominant structure.

In Lebanon, the holding and operating unit range from 8-40 dunams, that is, family sized operations.² In Cyprus, there is quite an admixture of holding units, the larger being near Limassol and the family sized centered about Famagusta where about 2/3 of the citrus acreage is located.³

PLANTING DISTANCE

New tree plantings in Israel are at a distance of 4 x 6 meters from each other. A dunam (1000 sq. meters) then, consists of about 41 trees at present rather than 70-80 trees which characterized the earlier spacing techniques.

¹E.L. Levie, "Production Costs, Profits and Losses in Citrus Groves, "Economic News Tel Aviv, Apr. 1954, P. 37

²J.H. Burke, A Study of the Citrus Industry of Lebanon, USDA., F. A.R., No. 58, Wash. D.C. May 1951, p. 9

³J.H. Burke, Observations on the Citrus Industry of Cyprus, U.S.D.A., F.A.R. Wash, D.C. Apr. 1951, pp 1,7

It is thought that the yields will not suffer in comparison to the past prolific yields, the highest in the Mediterranean region and seldom surpassed elsewhere. Citrus experts in Israel believe, that a similar yield per dunam based on increased productivity per tree under the new system can be effected. The cost advantages of cultivation in the new system are manifest. The old system required about 16 days of hand cultivation/dunam/year, while the new spacing system which permits mechanization requires 2.5 man days, 2 draft animal hours and 1.25 tractor hours.¹ In 1954, labor was paid upward of IL. 5/day, while tractor use amounted to less than IL. 5/hour.²

In Lebanon, groves near Sidon and Tripoli, tended to be densely planted with approximately up to 75 trees per dunam, while groves of Tyre in the south tended to be planted with trees widely separated to permit mechanical tillage, "But this is the exception in Lebanese citrus cultural practice."³ Most orange groves in Cyprus also practice very dense planting.⁴

¹B. Gurstein, "The Development of Citrus Planting and Cultivation Methods," Economic News, Tel Aviv, Apr 1954, p.28

²ibid

³J.H. Burke, op. cit, May 1951, p.10

⁴J.H. Burke, op. cit, April 1951, p.8

MIXED PLANTING

In Israel mixed planting, that is the planting of other crops in between trees in the citrus grove, has not been generally practiced. In the newer plantations intermediate crops such as peanuts and potatoes are raised until, at least, the trees begin to commercially produce, a period of about five to seven years. Such intermediate crops can obtain for the grove income to cover much of the cultivation and irrigation costs.¹

Lebanon, on the other hand, practices interplanting citrus with bananas and loquats. Orchards are only rarely planted with one citrus variety² a fact which makes for difficulty in accounting costs and returns for citrus. Turkey usually grows wheat, beans, or other vegetables between her trees, permitting only the barest hand cultivation of her groves.³

CITRUS EXPORT VARIETIES

Among sweet oranges, the Shamuti also known as the Jaffa orange is the major variety grown by the three exporting countries of the Middle East, Israel, Lebanon and Cyprus.

¹B. Furstein, op. cit. Economic News, p. 28

²J. H. Burke, op. cit. May 1951, p.10

³F.S. Bodenheimer, Citrus Entomology in the Middle East, The Hague 1951, p. 616

It is a seedless (or almost seedless) variety, oval in shape, tender and sweet in flavor with a thick peel which tends to separate easily from the pulp. It begins to mature by mid November and its shipping season usually extends through March. The thickness of its peel serves to protect it from bruising. This is a decided advantage for a fruit which is transported long distances to an import market. The Shamuti has a disadvantage however, in the European Market where the preference is for smaller sized oranges. The Shamuti generally tends to run to very large sizes compared to other Mediterranean oranges. Those Shamuti which are smaller sized, however, fetch high prices. The European consumer doesn't appear to be willing to pay premium prices for the larger Shamutis, less of which come per case than the smaller sized Shamutis.

It is thought that the Shamuti is a mutation of the Beladi, a smaller thinner-skinned, seedy orange which grows in all the citrus regions of the Middle East. In Lebanon, there are two distinct groups of Shamuti: ~~as~~ the Yafawi (Jaffa) which is sweet and thick skinned like the Israeli Shamuti, and the Beladi which is thinner skinned and seedier like the earlier Beladi. The original Beladi is used mainly for home consumption in the

exporting regions of the Middle East as well as the regions which produce wholly or largely for home consumption - Egypt, Turkey, Iran, Iraq, and Syria.

The Valencia, following much behind the Shamuti in importance, is also known for its delicious flavor, and it too has the advantage of thick skins for protection in distant transport. The importance of the Valencia lies in its somewhat later maturity than the Shamuti, thereby lengthening the shipping seasons. Interest in the Valencia in Israel is also heightened by the fact that it doesn't grow to such large size as does the Shamuti. These advantages, however, are minimized by heavy fruit fly infestation later in the season.

The Washington Naval is being tried out in all the citrus exporting areas of the Middle East and in Egypt. This is also a superior eating orange with a thick peel and seedless. It, too has the possibility of extending the shipping season, in that it is an early maturing fruit. It matures toward the beginning of October. Since the fruit fly infestation is not particularly heavy at this season, this variety holds some promise for further development.

The Clementine is produced in most of the Middle East. This variety is an orange-tangerine hybrid. Since its

maturation period occurs a month earlier than the Shamuti. It too is thought of as a possibility for the extension of the citrus season. At present it is being produced largely for home consumption however.

Another minor variety produced in most of the Middle East is the Mandarin. This is a loose skinned orange with the easy-to-peel advantage of the tangerine. This variety as well as the Clementine is heavily cultivated in North Africa which because of closeness to the European markets has a distinct advantage over the Middle East producers. This transport advantage includes the possibility of cheap bulk shipping and seriously hampers the extension of cultivation of these varieties in the Middle East countries which cannot hope to compete in so far as the greater distance to the European market prohibits bulk shipments of this easily bruised variety.

Outside the U.S. Israel is the most important grapefruit exporting nation in the world. However, Cyprus also cultivates grapefruit and there is a possibility that with an increase in European demand for this product, Cyprus will increase its cultivation. The variety almost exclusively grown is the Marsh Seedless. This matures in the interior of Israel by early October, and

In the coastal stretch the season extends from November to the Middle of April. The grapefruit is Israel's third most important citrus variety following the Shamuti and almost on par with the Valencia orange.

Sweet lemons are grown in most of the Middle East for local consumption. Particularly favored in this area is a rather insipid drink made from this variety. The sour lemon, however, is cultivated for export as well as domestic use in the three citrus exporting states of the region, Israel, Cyprus, and Lebanon. While in Cyprus and Israel, lemon cultivation is still a minor element constituting somewhat less than three percent of total citrus acreage to lemon cultivation. In Israel, the favored variety of lemon is the Eureka which is ever-blooming and provides ripe fruit in the midsummer season when it fetches premium prices in the domestic market.

the sentence?

Lime production is important only in Egypt, one of the world's major producers of limes. Although eight separate varieties are grown, the Egyptian Lime or Limun Rashidi is the major variety.

ROOTSTOCKS

The application of a budding technique¹ has many purposes which include hastening the on coming of the fruit bearing period of citrus trees, increasing the vigor of the growth of trees, increasing resistance of trees to particular plant diseases, changing the sugar and acid content of the fruit, and/or extending the life span and fruit producing period of citrus trees. An orchardist then, wishing to achieve one or several of the above results will bud his trees onto a different variety of citrus rootstock, as it suits his purpose. The two major rootstock varieties used in the Middle East are the Sweet Lime and the Sour Orange.

The Sweet Lime is used on the lighter soils in Israel, Cyprus and Lebanon. The Shamuti when budded onto this variety attains a commercial production at about the age of five years and for the next twenty five years or so puts forth a vigorous growth of fruit, although the tree usually becomes dwarfed in size. The fruit produced tend to have a somewhat lower sugar and acid content

¹ This is a technique whereby one citrus variety is "budded onto" another citrus variety in order to give the strengths of the first variety to the second. The name given to the first variety is "rootstock", and the name given to the second is "scion" or "scion stock".

than fruit budded onto the Sour Orange, however not enough to detract from the deliciousness of its flavor.¹ The Sour Orange is also an important rootstock in this area, particularly Israel. Groves planted on heavy soils, and this includes all grapefruit, utilize this variety in order to provide greater resistance to gummosis (a fungus disease). Trees budded onto this variety grow much larger than the dwarfed height of the Shamuti budded onto the Sweet Lime. The fruit also differs in that it tends to produce smaller and thinner-skinned fruit than the scion of the Sweet Lime.

In Turkey, the great majority of older trees are grown from seeds and are not budded. The citrus experiment station in Hutalya is doing much to encourage improved techniques, however, and in the new plantations of the southern area, Sweet Lemon is usually applied as a rootstock.

FERTILIZATION

In those countries where animal husbandry is practiced extensively, there is usually a greater abundance of cheap organic manures than in those countries where there is little animal husbandry. Thus, while Lebanon has

¹Kurt Mendel, Rootstocks and Varieties in Israel Citriculture, "Israel Export Journal", May 1956, p. 32

adequate organic fertilizers for the needs of her orchards, Israel and Egypt, both having low animal stocks per capita, use heavily, chemical fertilizers, and Cyprus uses both organic and chemical fertilizers in adequate combination (only since World War II). Studies in Israel seem to indicate, however, "that the citrus tree can attain a reasonably high grade of fertility when it is manured with chemical fertilizers only, provided that the fertilizer be adjusted to the conditions of the soil and the demands of the trees."¹ Never the less, increasing use is being made of green manure to offset the declining use of animal manure in Israel in combination with increasing use of chemicals. In Israel the manure problem became poignant with the founding of the state in 1948 and fleeing of the Arab population. The concomitant decline of Arab agriculture with its predominant use of animal power and animal husbandry, and the increase of Jewish agriculture with its small animal husbandry and small use of animal power brought about an acute shortage of organic manure. The rise of a chemical industry, on the other hand, guaranteed the abundance of chemical fertilizers. Israel has made

¹ M. Winnik, "Fertilization of Citrus Groves," Israel Export Journal, May 1956, p. 42

advantageous use of her indigenous supplies of potassium and phosphorus for fertilization purposes. Israel lacks, however, nitrogen, which is imported and efficiently applied so that all her mineral fertilizer requirements are satisfactorily met.

IRRIGATION

Irrigation is practiced in all citrus producing regions of the Middle East. The application of irrigation varies with the season. The Mediterranean climate supplies, generally, sufficient moisture from November through March in much of the citrus regions of Israel and Lebanon. Irrigation must usually be applied from April through October with heaviest applications during July, August and September. Cyprus's citrus districts usually receive somewhat less natural moisture than Lebanon or Israel and hence usually require more and longer applications of irrigation.

In the earlier section of this chapter it was noted that basin irrigation with its concomitant disadvantages is used in all citrus regions of the Middle East with exception of Israel and to a much smaller extent Cyprus.

¹ Jacob Pratt, "Irrigation of Citrus Groves" Israel Export Journal, May 1956, p. 29

As early as 1928, in the vicinity of Pardess Hannah in Israel, sprinkler irrigation was being used. Currently many groves in Israel use the sprinkler system which is based on a combined network of steel pipes and installation of light pipes which are portable to do the actual sprinkling. It has been estimated that this system had reduced by half the use of manual labor in the area of activity and therefore decreased costs proportionately.

DISEASES, PESTS AND THEIR PREVENTION

Good practices as regards citrus cultivation have been demonstrated to be the best preventative and remedy for citrus diseases and pests. Included in these citri-cultural practices are the application of pesticides and fungicides when necessary, rational prunings, soil conditioning, wind breaks and proper stock selection (including rootstock choice). These general practices, however, are not used in much of the area of the Middle East, and therefore, pests and diseases not infrequently reach epidemic proportions. Israel and to some extent Cyprus have established major programs for dealing with these problems, yet in Israel itself diseases alone cause damage to citrus currently amounting in cost to

almost 1. L. 7 million annually.¹

Among the more important diseases which attack the citrus trees of the Middle East are Xyloporosis, Little Leaf and Psorosis (Virus Diseases); Blast (Bacterial Disease); Brown Rot Gummosis, Diplodis Gummosis and Mal Secco (Fungus Diseases).

Prevention of the virus diseases can for certain varieties, be obtained in the use of certain rootstocks, thus the Shamuti orange budded onto Bitter Orange rootstock is most susceptible to "Little Leaf". Orchardists attempt to overcome this susceptibility by planting Shamuti on Sweet Lime in light soils. Psorosis has attacked a number of Valencia trees in Israel and Lebanon (as well as grapefruit trees in Israel) and is being checked to some degree by application of Dinitro-cyclo-hexephyl. Israel is taking the further precaution by checking and registering nursery seedlings to avoid spread of Psorosis. The orchardists of Lebanon, however, are accustomed to develop their own seedlings in their

¹Reichert, "Diseases of Citrus Trees in Israel", Israel Export Journal, May 1956, p. 301. For comparative purposes, 1. L. 7 million could bring into bearing currently almost 13,000 dunams of citrus orchards. This is about equal to 10% of current citrus bearing acreage (see Chapter IV of this study)

groves and are not sufficiently knowledgeable, generally, to detect whether the seedlings are affected with this virus. It is therefore expected that while this disease will decline in Israel, it may spread in Lebanon. Copper sprayings are used by Israel, Lebanon and Cyprus to control Blast disease.

The fungus diseases are most associated with too much watering or poor drainage (particularly Egypt and Iraq, but to some extent also in Turkey, Lebanon and Israel.) It has also been found that Sweet Lime rootstocks are more susceptible to fungus, therefore in addition to rationalizing irrigation methods or improving drainage, inarching of a Bitter Orange rootstock has been found effective in the above regions in combatting fungus. Mal Secco (one of the fungus diseases) has required severe pruning in Israel and the provisions of wind breaks for its remedy.

Among the more serious citrus pests is the Mediterranean Fruit Fly. The early season varieties such as the Naval Orange and the Clementine receive some infestations, but not nearly as heavy as the late maturing fruit such as the Valencia. Iraq is relatively free from the Mediterranean Fruit fly and other citrus pests and forbids imports (although her own production is not sufficient for

her own needs) for fear of entering into the country the fruit fly. It is by no means certain that increasing citrus planting might not also increase the possibility of occurrence of citrus pest problems.

Israel has sought to extend her citrus season by planting different varieties than those which are now the major ones. Extension of the citrus season, however, beyond the few months of winter and very early spring, means that Israel must cope with the increased infestation of the fruit fly. Because of the climate in this area, the incidence of the Mediterranean fruit fly is most heavy in the Spring and Autumn,¹ the seasons most eligible for extension of the citrus season. This pest, is also a serious problem in the similar climatic zones of Lebanon and Cyprus.

In Israel, a fairly good control of the adult fruit fly is being achieved particularly in regions which are not densely planted and spraying can be effective. Sprayings in Israel are sometimes given in two treatments at the onset of the

¹The winter cold and rains discourage the fruit fly as does the arid summer, particularly the Khamsin. The mildness of Spring and Autumn seems to attract the fruit fly in even larger numbers than tourists.

fruit fly season in Spring, (determined annually by observation posts of the Division of Plant Protection), and a combined treatment against flies and scales in September or October. The latter treatment is usually finished about four weeks before picking begins. An additional precaution against pests by fumigating with Ethylene Dibromide occurs when the fruit is packed in Israel and in Cyprus.¹ Powered wheeled spray rigs are used extensively in Israel and in Cyprus. In Lebanon a beginning is being made in spraying by use of small portable pumps. Because of the density of plantings powered wheeled spray rigs are ineffective in Lebanon. No fumigation is used in Lebanon. It is easy to understand that there is an extra ordinarily large incidence, of infected Lebanese fruit when marketed.

Rust Mite and Black Scale (Florida Red Scale) are perhaps the most important pests in the entire area. The former attacks all citrus varieties but seems to prefer lemons. It incurs heavy damage to the fruit even though it is most prevalent on the leaves during the greater part of the year. Two sprayings a year with

¹ A. Gruenberg, "Pest Control in Israel's Citrus Groves," Israel Export Journal, May 1956 p. 37

lime sulfur or oil emulsion are necessary to contain this pest. While these treatments are given regularly in Israel and Cyprus only a small percentage of the groves are treated in Lebanon. Black Scale's fecundity (it produces five generations in a single year) has made one of the most serious problems in recent years. Extremes in temperature tend to limit the destructiveness of the specie, while the usually mild climate of Israel, Lebanon, and Cyprus, permit ideal conditions for its growth. Spraying with mineral oils serves to control this pest which, however, continues to inhabit every grove in the Middle East. Again Israel and Cyprus have developed programs for limiting the scale, but in Lebanon only few groves are treating it.

Israel has developed a highly organized entomological service which advises the grower as to best methods, timing and insecticides to use. Although it is mainly advisory, it enforces treatments when the importing country requires quarantine measures. It is continually testing new methods, compounds and residual toxicity so as to more effectively combat pests without harming the fruit or poisoning the consumer. It is effective in inducing use of new insecticides by recommending their purchase by the Citrus Marketing Board which then advances

or sells at low rates to the farmer. The board trains and licenses specialists in order to advance its standards and is supported in part by the government and in part by farmers through the Marketing Board.

PRUNING AND PICKING

The pruning techniques are closely related to the type of cultivation which prevails and also determine the methods of harvest. Thus in areas of close planting, the lower branches in order to allow for hand cultivation must be severely pruned. This typifies the pattern in most of the Middle East. Pruning, however, isn't much in evidence in Israel largely because of the lowness of the Shamuti budded onto the Sweet Lime and to a lesser extent because of the wider spaces between trees in the new plantings.

In Lebanon, because of the severely pruned lower limbs of the tree, the branches are left weak. A free standing ladder must be used for picking. The fruit is picked with the aid of very heavy clippers that frequently tend to injure the fruit and cause fast decay. The picked fruit is carried in reed baskets, which filled, weigh up to 15 pounds, to central weighing points in the groves. After which the fruit is transferred to burlap bags and then carried, usually by donkeys to

packing houses.

In Israel fruit is picked with the aid of standard clipping shears. Light weight magnesium semi-tripod ladders with platforms are used to enable the picker greater facility in picking without hindrance of a heavy pack on his shoulders. The picked fruit is transported out of the grove in 84lb. boxes carried by vehicles to the packing houses.¹

¹ It is conventional in citrus literature to discuss picking and packing as a unit. For the purposes of this paper, however, discussion of packing, because it is so related to marketing practices, will be deferred to the final chapter on marketing and markets.

CHAPTER IV

ISRAEL CITRUS PRODUCTION, TRADE AND ORGANIZATION

History of Citrus Production to World War II

Commercial cultivation of citrus in Palestine was begun little more than 150 years ago by Arab orchardists¹ and by the second half of the 19th century there was a small export of the Jaffa orange to England. During this period the first citrus grove was purchased by a Jew, Sir Moses Montefiore. Up to the early 1900's no direct shipping between Jaffa and England took place owing to the lack of a direct shipping line. Boxes of citrus were brought to Jaffa Port by camel and loaded upon small boats for transport to Alexandria. At Alexandria the citrus was reloaded onto bigger ships which plied the Mediterranean largely in order to deliver Egyptian cotton to Liverpool. The citrus was unloaded at Liverpool which port received more than 90% of the Jaffa orange shipped to England.

By the turn of the twentieth century, other Jewish individuals and groups began developing citrus groves. The rate of development was low; it is estimated that

¹ N.W. Hagen, The Citrus Industry of Palestine, U.S.D.A., B.A.E; Wash. D.C. 1938, p. 2

by the outbreak of World War I, only about 35,000 dunams were planted to citrus in Palestine of which about 12,000 dunams were Jewish owned.¹ Prior to the World War, the deep plow had not yet been introduced to citriculture in Palestine, couch grass, therefore, had to be pulled by hand. This operation was slow and expensive and perhaps helped account for the fact that citrus acreage increased so slowly. Irrigation was also in a low state of development and was obtained by animal drawn water (nuriyas) from shallow wells. Stocks were grown from cuttings of older trees. These were difficult to obtain because of the reluctance of the owners of the older trees, to permit cuttings. Therefore, the cuttings were usually stolen at risk of life under the cover of darkness.²

Immediately prior to the World War, direct shipping between Jaffa and England was established by the Prince Line and other companies. More progressive methods for development and culture of the citrus groves were introduced by Jews at the same time. This included deep well drilling and machine pumping of irrigation waters and transport of the boxes of citrus to docks by motor cars

¹Y. Rokach, "Hundred Years of Citrus Growing in Palestine," Economic News, Tel Aviv, April 1954, p. 10.

²ibid

and later by trains.

The advent of the World War, however, brought about a cessation of exports and the uprooting of about 5000 dunams of citrus groves, leaving about 30,000 dunams remaining intact, although most of this was in very bad condition.

During the interwar period, Palestine passed through a stage of rapid growth of Jewish settlement and a very rapid development of the citrus industry. Jews purchased land at very high prices, in order to develop citrus groves, from Arab landowners who, upon receiving such high prices often proceeded themselves to develop citrus groves on the remainder of their lands. From 1922/3 to 1936/7, the area planted to citrus increased more than ten fold.

The following table reflects the booming activity which this field witnessed:

CITRUS PLANTATIONS, NEW PLANTINGS AND OWNERSHIP, 1922-36
(In thousands of dunams)

<u>Year</u>	<u>Jewish Ownership</u>	<u>Arab Ownership</u>	<u>New Plantings</u>	<u>Total Planted to citrus</u>
1922/3	10	19	----	29
1923/4	10.5	19	0.5	29.5
1924/5	11	19	0.5	30
1925/6	11.5	19	0.5	30.5

CITRUS PLANTATIONS, (con't)

<u>Year</u>	<u>Jewish Ownership</u>	<u>Arab Ownership</u>	<u>New Plantings</u>	<u>Total Planted to citrus</u>
1926/7	17	21.5	8	38.5
1928/9	31	36	11	77
1929/30	46	41	20	87
1930/31	60	46.5	19.5	106.5
1931/2	70	51.5	15	121.5
1932/3	90	66.5	35	156.5
1933/4	120	80	43.5	200
1934/5	145	105	50	250
1935/6	153	125	28	278
1936/7	155	143	20	298

Sources: I. D. Ophen, "The Area Under Citrus Culture," Economic News, Vol. 6, Nos. 1-2, April 1954, p. 19
 B.D. Weinryb, "M.E. Agriculture in the Interwar Years," Agricultural History, April 1952, p. 58
 B.D. Weinryb, "Palestine Citrus Industry," Palestine Affairs Vol. 11, no. 4, p. 39
 M.A. Wulfert, Citrus Fruits, World Production and Trade, U.S.D.C., B.F. and D.C. Wash. D.C. 1940, p. 49
 Y. Rokach. op, cit. p. 11

Eschewing for the moment any discussion on rates of profit, it is worthwhile to turn attention to the picture of immigration and capital import during the interwar years. Surely, if capital were not available for investment, no matter what the rate of profit, citriculture

would hardly have expanded so rapidly. It was noted above that, Palestine went through a rapid growth of its Jewish population during the interwar period. The major element, however, accounting for the large investment in citrus groves immigrated during the period of the fourth aliyah (Immigration wave).

The wave of immigration beginning in 1924, brought into the country large numbers of middle class imigres from Poland who sought to escape the onerous taxation that the Finance Minister of Poland had contrived during this period to squeeze trade and industry, largely in Jewish hands. Prior to this aliyah, the Jewish immigrants were composed of workers and students, usually devoted to highly idealistic notions of various shades of socialist settlement. With the immigration of this new middle class from Poland funds became available as well as entrepreneurial facility for profitable investment.

Thus, of 12,856 Jewish immigrants into Palestine in 1924, 5281 (41.1%) were "Capitalists and their families", and in 1925, there were 33,801 Jewish immigrants of which 11,794 (34.6%) were "Capitalists and their families".¹

¹A. Bonne, Eretz Yisrael, Haaretz V'hakalkalah (Hebrew), Published by D'uir, Tel Aviv, 1937, p.28

In addition, the fifth aliyah beginning in 1922 brought large numbers of German "capitalists" into Palestine to escape from the terror beginning to rise in that country. Some of this element also participated in the rapidly expanding investment in citriculture.

All in all, Jewish immigrants brought into Palestine L.P. 37 million in the 1920's and L.P. 72.13 million in the 1930's (1934 and 1935 being the peak years of capital import).¹ These large sums induced a rapid transformation in the whole of the Palestinian economy including citriculture.

From 1937 to the eve of World War II, only 1,500 additional dunams were added to the citrus cultivated area of Palestine. Up to 1934/5 the rate of growth of Jewish owned groves increased faster than that for the Arab. The rate of growth of Jewish owned groves rapidly declined from this point on while Arab owned groves continued their large growth over the next two seasons 1935/6-1936/7 bringing the total acreage of groves owned by Arabs closer to that owned by the Jews who had superseded Arab ownership from 1929/30 on.

¹ Datlavowitz, Kalkalat Yisrael (Hebrew), Published by Masada, Tel Aviv, 1954, p. 67.

Several questions are implicit in the above description. What was the profit rate which induced the rapid increase of citrus cultivation? What differences in the structures of the Arab and Jewish sectors of citriculture obtained in the more striking fluctuation-earlier rapid decline and earlier rapid increase-of the Jewish rate of citrus development?

CITRUS TRADE TO WORLD WAR II

Only a small percentage, approximating 9% of total citrus harvests were consumed by the home market during the interwar period. The large portion, then, going for export, provides the basis for determining the answers to the questions posed above.

In the fifty year period, 1888-1938, citrus exports from Palestine increased 150 fold, from over 10,000 boxes at the beginning of the period to over 15,000,000 boxes at the end of the period. It is estimated that had not World War II intervened, exportable citrus would have increased to over 23,000,000 boxes during the next five years when all of the area planted to citrus would have come into the bearing stage.

What were the market prices which induced the rise in exports at an average annual rate of 300% from the beginning to the end of the period noted above? What was

the anticipated efficiency of capital invested in citrus which caused the rise, and the real efficiency, in the short run, which caused the decline in capital investment in citrus?

It is impossible to formulate a table of costs and returns with any consistency. Many different commentators make estimates which differ too widely from one another in terms of value of exports. It is necessary, therefore to attempt to synthesize the welter of discrepancies, differing currencies¹ and differing bases of measurements as well as the writer is able, but who in good conscience pleads integrity in selecting the data which follows.

Prices fetched for a box of fruit on tree for the three

¹ Prior to 1927, Palestine had no currency of its own. Before the first World War, Palestine was part of the Ottoman Empire and so Turkish money constituted legal tender, however foreign coins circulated concurrently. During the War Palestine was the victim of inflationary issues of paper money, which when withdrawn from circulation in 1918 by Lord Allenby, following the British conquest, had lost 90% of its pre war value. Egyptian currency was then made legal tender for Palestine. Palestine's price structure then approximated Egypt's which from 1917 on was caught in the grip of explosive inflation. Annual average wholesale prices in Cairo rose from 100 in 1913 to 128 in 1916, but rose to 312 by 1920. Britain's Dear Money Policy of 1920 induced a rapid deflation from that date on. Average annual wholesale prices in Palestine fell from the new index of 100 in 1920 to 41 in 1927 when Palestine was granted her own British linked Currency. See R.D. Ottensooser, The Palestine Pound, Libraire E. Droz, Geneva, 1955, pp.14-17, and D. Gurevich, Statistical Abstract of Palestine, 1929, Heren Hayesod, Jerusalem, 1930, pp. 1758

years prior to World War I averaged P. T. (Egyptian) 12. In the three years following the War the average price amounted to more than P. T. 36.¹ This rise of price of 300% approximated the rising wholesale prices in Cairo which averaged 211 in 1918, 231 in 1919 and 312 in 1920, from a pre war base of 100.² Owing to the deflationary policies of Great Britain during the 1920's (see note 1 on preceding page) prices began rapidly to fall, but citrus prices held firm and in some years advanced against price trends.

The advance of citrus prices was not so much secular as based on specific conditions of the export market. Thus in 1923/4, there was a price increase to P. T. 38 fruit on tree. During this season English dock laborers called a strike. Spanish shippers quickly diverted their stocks to the continent. Palestine shipments which were already on the way were unable to be diverted and had to hole up in port. These were the first fruits available to English buyers following the strike, and because of pent-up demand for "Exotic fruits," the prices rose substantially.³

¹Dr. I. Weinberg, "Prospects of Orange Production in Palestine, Palestine Citrograph, Vo. 1, no 2, March 1928, p.6

²R.D. Ottensooser, op. cit. p. 15

³Dr. I. Weinberg, op. cit. p. 6

As seen in the table on pages 48-49 of this study, the large increase in new citrus planting began during the 1926/7 season. This increase in large measure can be attributed to the preceding season's remarkable profits.¹ While general prices continued falling in 1925/6, Palestine citrus fetched almost P. T. 43/box of fruit on tree.² During this season a frost occurred in Spain. Spanish shippers sent spoiled citrus on the market and the resulting loss of confidence in the Spanish product caused an extraordinary demand for Jaffas.

1. Rokach estimates the breakdown of cost and return for the Palestinian orchardist to show the continuing good return for investment in citrus during and following the 1927/8 season.

The average price/box of oranges in 1927/8 was 10 shillings F.O.B. Expenses that season are estimated as follows:

COSTS OF ORCHARDRY IN PALESTINE 1927/28
(In milils ³)

<u>Item</u>	<u>Cost/box</u>
Picking	10
Packing	35

¹Aside from the active seeking for investment openings owing to the large imports of capital described above.

²Dr. Weinberg, op. cit, p.6

³1000 mils equals IL. P. equals 1 L. Sterling equals \$4.68
It was during this season that the currency union of Egypt and Palestine was abolished and Palestine, for the first time had its own currency, albeit linked to British Sterling.

COSTS OF ORCHARDRY (con't)

<u>Item</u>	<u>Cost/box</u>
Packing Material	78
Transport Material	25
Storage	5
Lighterage	10
Sundry	10

Source: I. Rokach, "Survey of Orange Season 1927/28",
Palestine Citrograph V. I. No. 5, p.1-6

Subtracting the above expenses to the orchardist leaves an average price for a box of fruit on tree of 6/6.

Rokach estimates that Jewish orchardists who sold their fruit through "Pardess," a cooperative for orange growers, received an average price per box of 7/3. Rokach assumes an average yield of 120 packed cases/dunam for the "medium quality grove"¹ This would yield a gross income/dunam of L.P. 43.5 Deducting L.P. 12/dunam for working expenses and L.P. 5/dunam for other tithes and other taxes leaves a net income of L.P. 26.5/dunam.²

If we deduct 20 boxes/dunam as being too high an estimate and thereby reduce the net income by about 17%,

¹The 120 cases/dunam figure is probably too high by, at the very least, 20 for the "medium quality grove."

²I. Rokach, op. cit., pp. 1-6

the net income/dunam to the grower is still considered quite good in so far as it represents a return of over 25%/year on investment.¹

For the decade 1921/2-1930/1, the F.O.B. price of a box of oranges averaged 533 mils while costs averaged 295 mils. During the next few seasons the average price of a box of oranges F.O.B. fell by almost 100 mils, but still brought a good return to the orchardist. Prices continued to fall during the last four prewar years until profits to the orchardist diminished to almost nothing. In the following table, R. Nathan dramatically represents the situation of the citrus grower in Palestine who seeing good to excellent returns on his investment, that is a high marginal efficiency of capital so invested, continues through the 1920's and early thirties to accelerate the pace of development of new groves, but in response to the exoste analysis, decreases the pace of development.

¹For figures estimating gross investment in a dunam of fruit bearing citrus orchard, See p. 58 of this study

COST, PRICE AND RETURN/CASE OF SHAMUTI ORANGES 1932/3-1938/9
(Palestinian Mills)

Season	Cost of culti- vation	Cost from tree to ship	Cost F.O.B to free England	Cost F.O.B to free Quay,	Total op. cost	Price in England	Return per case
1932/3	120	170	200		490	658	168
1935/6	120	170	200		490	605	115
1936/7	120	170	200		490	555	65
1937/8	120	170	200		490	525	35
1938/9	120	170	200		490	500	10

Source: R. Nathan, O. Gass, D. Creamer, Palestine: Problem and Promise Public Affairs Press, Washington, D. C. 1946, p. 210

This table reflects the position of the average Jewish grove with a full bearing yield of 75 cases of exportable fruit/dunam. Such a grove represents an investment of about L. P. 83/dunam including land. With a return of 168 mils/case, such a grove would earn a quite good return of L. P. 12.6/dunam, but with a return of 10 mils/case it would earn only L. P. 0.750/dunam, or less than 1% of invested capital.

Only Arab groves with very low labor costs, lower investment/dunam, lower yields but also lower unit costs/box, and exceptionally well managed Jewish groves could earn a substantially high return than 1% in

1938/9.¹ In times of good prices, generally, the average Jewish grove earned much higher profits per dunam than the average Arab grove, but Arab groves were better able to withstand price declines. Hence, the differential in the Arab and Jewish pace of development groves.²

Nathan and his associates also note for the pre-war years an average cost for grove maintenance varying for Jewish orchardists from about L.P. 7 - L.P. 15/dunam. Assuming a yield of 75 exportable cases of Shamuti oranges/dunam for an average quality grove and a maintenance expenditure of L.P. 9/dunam or a cost per case fruit on tree

¹J. Mouchly, a man with citrus connections in Palestine and Cyprus during this period estimates costs somewhat lower; therefore yielding a somewhat higher and more feasible return to the orchardist (including marketing costs which Nathan eschews)

<u>ESTIMATED COSTS/BOX OF ORANGES 1938 (In Palestinian Mils)</u>	
Grove (labor, manure, irrigation, fumigation etc.)	65
Picking and Packing (packing materials)	120
Transport (rail and ocean freight)	140
Marketing (customs, brokerage, insul. repacking etc.)	125
TOTAL	450

Source: J. Mouchly, The Citrus Industry Today and Tomorrow, Haifa, 1939. p. 6

²Mouchly notes that costs for planting and cultivation were nearly 40% higher for the Jewish orchardist than the Arab orchardist. To maintain a grove in bearing Arab costs were 1/2 Jewish costs. Arab labor was paid at the rate of 100-120 mils/day while "casual" Jewish labor received 200-222 mils/day.

of 120 mils, an average quality grove than earned some return on invested capital when oranges sold at a price yielding a grower over 120 mils/case fruit on tree. A first class, expertly administered grove could achieve a yield of 100 exportable cases of oranges with an outlay of L.P. 8-10/dunam. Such a grove could earn some return on invested capital at any price which would yield the grower more than 80-100 mils/case of fruit on tree. With costs as low as these Palestine's competitive position was very strong in the immediate pre World War II years.¹ However, even with the decline in the Spanish product from the beginning of the decade and its accelerated decline following the Civil War, the growing quantities of Italian, American and Palestinian fruit in conjunction with depressed business conditions and unemployment in the European market induced, an earlier saturation point for citrus consumption than had been anticipated.

The export of citrus had accounted for about 75% of the total value of Palestine's exports before World War II.

¹The average return received by U. S. Growers per case of oranges on tree during the lowest five year period in the history of orange prices 1935/39 was \$1.02. This compares quite favorably with the return of 80-100 mils which is equal to 38-48¢, the break even point for the grower of first glass grove in Palestine. See R. Nathan op. cit. pp. 429-31

Over 19,000 laborers were employed in this branch during the citrus season, and 7-10,000 were permanently employed in citrus.¹ Palestine moved up from fourth place in World orange exports after Spain, Italy and the U. S. in the 1920's (during which period Palestine exported only 1/10 as many boxes as Spain), to the first place by 1938/9.²

CITRUS PRODUCTION AND TRADE FROM WORLD WAR II TO THE PRESENT

After the outbreak of World War II, Palestine's citrus exports declined to negligible levels. The 1939/40 season saw the closing of the Mediterranean and only several thousand boxes of citrus were disposed of outside of Palestine.³ The inability to export, except for small quantities to the Allied Armed Forces in the Middle East, brought about the neglect of most groves and the abandoning of some for the duration of the war. Most groves received only a minimum of attention, largely just sufficient irrigation to keep the trees alive for the post war period.

The first post war season 1945/6 was characterized by shortages of packing materials and lack of transport

¹Havaad Haleumi, Sefer Hakalkalah Hayishuvit, (Hebrew) Tel Aviv, 1947, p. 271

²R. Nathan, op., cit. p. 432

³The weight per box of fruit prior to 1940 was 34 kg. After 1940 the boxes weighed 40 kg.

facilities, owing to which part of the picked fruit couldn't be shipped and part decayed in transit.¹ During this season 4,898,833 cases were exported of which 832,842 were grapefruit and 51,674 were lemons.²

The last two pre-State of Israel seasons, 1946/7 and 1947/8, witnessed the resurgence of the yield and exports respectively.³ In the 1946/7 season, sales to the U.K. accounted for 78% of the total while Eire and the continental countries accounted for the remaining 22%. During 1947/8, the U.K., contracted for 88% of the exportable total. The continental countries and Eire, however, partly in consequence of suspension of sterling convertibility and partly on account of excessive spoilage in the shipments of Palestinian citrus in the preceding season purchased only 12% of the total. Most striking was the complete absence of orders from Belgium, one of the more prosperous countries of immediate post war Europe, which had purchased 880,000 cases of Palestinian citrus in the preceding season, 1946/7.⁴

¹B.D. Weinryb, "Palestines Citrus Industry, Palestine Affairs," Vol. 11, no. 4, N.Y. p. 41

²Rokach, op. cit. p. 15

³ibid

⁴S. Tolkowsky, "The Citrus Industry", in 1947/8, "The Palestine Economist" Annual, 1948, pp. 94-5

The cost-return situation changed radically during the post-war period. Picking, packing and transport costs tripled from the pre war period, while packing materials which were very scarce and almost entirely imported were more than quintupled in price. The cost items most dependant on the domestic price level were labor, organic manure and irrigation water. Of these irrigation water costs remained relatively stable while labor costs increased by approximately 350%. Total costs for cultivation and harvesting increased 400% over the pre-war cost structure.¹

Citrus prices fluctuated between 26-28 shillings (13-1400 mils) per case F.o.b. in the last pre-state season (1947/8).² Rokach observes that "the price at which citrus sold in the 1947/8 season could be considered satisfactory although it did not leave the great majority of growers..." any appreciable profit and in many cases a loss.³ Aside from the increased costs, Rokach

¹R. Nathan, op. cit. pp. 430-1

²The price paid by the British Ministry of Food was somewhat lower.

³Rokach, op. cit. p. 160 It is difficult, however, to know what Rokach understands as being a "satisfactory" price and yet afford no "appreciable profit and in many cases a loss."

attributes the plight of the growers to the still deteriorated state of the groves where it was estimated that on the average less than 50 exportable cases of citrus were now being produced on each dunam.¹

Prior to Israel's Proclamation of Independence in May 1948, an estimated 231,833 dunams of fruit bearing citrus trees existed in Palestine.² During the 1948/9 season, only 109,500 dunams of citrus were cultivated in spite of the fact that only 10% of Palestine's citrus groves were outside the boundaries of the new state. This decline in cultivated area is largely explained by the panic which seized most Arab grove owners and caused them to abandon their groves, and to a lesser extent the abandonment of some Jewish groves in the face of the refusal of the Gov't of Israel to award subsidies or premiums to the growers while the labor organization had already decided to press for a 30% increase in wages at the end of the season.

The average yield of exportable fruit fell to only 37 cases/dunam and the estimated net price came to 400

¹ Pre war production amounted to 75 exportable cases (34 kg)/dunam as opposed to 1947/8 season 50 exportable cases (40 kg.) That is, production of exportable fruit was only 78% of pre war on the average grove.

² Palestine Citrus Board, Annual Report 1947/8

mils/case of fruit on tree, plus approximately one ton/dunam of fruit sold locally at I.L. (Israeli pound) 4/ton fruit on tree. Sachs estimates complete cultivation might have cost I.L. 40-50/dunam, but actual expenditure including depreciation was quite below this and the average grove showed a net loss of I.L. 6/dunam during the 1948/9 season while a few excellently managed groves showed a small net profit.¹ During the first citrus season in the new State of Israel, 1948/9, 6,369,000 cases of citrus fruits were produced of which only 61% not counting citrus products was exported.²

By the second season after the Declaration of Israel's statehood, Sachs tells us that although the groves in good condition showed profit, the aggregate net income was still not sufficient to cover total expenditures of the grower during 1949/50. Growers indebtedness increased considerably owing to the large percentage of groves still bearing unsatisfactory crops. This was the case even though the gov't granted "quite low" export premiums, and there was a very rapid rise of mechanical and modern processes adopted by the growers

¹M. H. Sachs, "The Citrus Industry in Israel 1948/9," Israel Economist Annual, 1948/9 pp.272-4

²Y. Rokach, "Hundred Years of Citrus Growing in Palestine", Economic News, Vol. 6, Nos. 1-2 April 1954 pp.16-17

during this season, as well as a "considerable" reduction in the amount of labor involved in producing the fruits.¹ During this season 6,244,000 cases of citrus were produced of which 68%, not including citrus products were exported.² During this season there occurred also a greater dispersion of Israel citrus over a wider range of markets than in the preceding post war years. Thus the percentage taken by England in 1949/50 (58.7%) closely approximates the percentage of total sales to England during the last pre-war season, 1938/9 (58%) and is in marked contrast to the 1948/9 season when England received 88% of Israel's citrus. This trend of wider marketing continued in the succeeding years, when sales to the U.K., declined as a percentage of total citrus exports even further to 40% in recent years.

During the next six seasons, 1950/1 - 1955/6, Israel production of citrus fruits increased as is shown in the following table. The first two seasons following the declaration of statehood, because of war conditions and further neglect of groves, aside from the wholesale

¹M.H. Sachs, "Citrus Industry in Israel in 1949/50," Israel Economic Annual, 1951, pp. 207-8

²Y. Rokach, op., cit. pp. 16-17

abandonment of groves spoken of above, resulted in much lower production than the optimum conditions ¹ would have permitted.

PRODUCTION AND EXPORT OF ISRAEL CITRUS 1950/1-1955/6

<u>Season</u>	<u>Total Crops</u>	<u>Exported Crop</u>	<u>Export as % of Total</u>
1950/1	8,207,000	4,185,000	50
1951/2	7,910,000	3,699,000	44
1952/3	8,038,000	5,325,000	63
1953/4	11,383,000	8,153,000	72
1954/5	9,666,000	7,062,000	73
1955/6	11,257,000	7,855,000	70

Sources: Y. Rokach, op. cit. pp. 16-17, Statistical Abstract of Israel 1954/5, pp. 98-9; U.S.D.A. Foreign Agriculture Circular, July 1956, and Dr. A. Arnon, "The Citrus Control and Marketing Board," Israel Export Journal, May 1956 p. 18

The average export over the first eight seasons of Israel's statehood was 63% of total citrus crop. This compares with about 91% exported of the total crop in the years prior to World War II. The percentage of locally consumed citrus increased during the years of heavy immigration and concurrent food shortages from 9% in 1948 to 23% in 1951/2. The quantities of citrus

¹That is conditions permitting adequate care for the groves so that production is unimpaired.

fruit consumed locally during these years would probably have been considerably larger had it not been for gov't policy discouraging local consumption. In as much as approximately 70% of total income from citrus exports represents an income of foreign (usually hard) currencies to Israel, the gov't has pursued the policy of encouraging exports by granting to exporters a percentage of their foreign currency income for the purchase of materials abroad.

With the decreasing rate of immigration from 1952 on and the increase in food production, as well as the increase in citrus production,¹ the percentage of citrus locally consumed has decreased to around 10% during recent years. The probability is that local consumption of total citrus production will not again constitute such large percentage barring war, extra heavy immigration coupled with severe food shortages or natural catastrophes.² The trend in the last few years has been toward a much increased program of new plantings in citrus with the express goal of again reaching in the near future

1 & 2 It should be noted that gov't "encouragement" of citrus exports as the major foreign currency earner plays a very important role in keeping domestic consumption down. In the absence of total free interplay of purely competitive marketing conditions, it is impossible, however, to know to what extent domestic market would consume citrus.

3000,000 dunams of citrus orchards.

The Israel Gov't took a census in Sept. 1951 which showed a total of 133,174 of dunams devoted to citriculture, 34,835 of which were administered by the custodian of Absentee Owners Property, an institution for the maintenance of abandoned Arab properties.

By 1953 after some of the acreage of citrus had been parcelled into building plots (those closest to city and development areas) to make room for immigrants and industry, and including new area planted to citrus the total citrus area was estimated to include about 138,000 dunams of which 125,000 were fruit bearing.¹ By the 1954/5 season there were already over 200,000 dunams devoted to citrus plantations.² During the 1955/6 season another 30,000 dunams were planted with citrus, almost 20% of present fruit bearing area devoted to citriculture.³

The present day location of citrus districts in Israel, with the exception of the Gaza area tends to approximate the prewar period. The coastal plain extending

¹ J.D. Ophen, "The Area Under Citrus Cultivation," Economic News, Vol. 6, nos. 1-2 p.20.

² Statistical Abstract of Israel 1954/5, p. 90.

³ U.S.D.A. Foreign Agriculture Circular, July 1956, p.2

15 miles south and 30 miles north of Tel Aviv-Jaffa has the heaviest concentration of citrus plantations. This includes in the north the areas around Petah-Tikvah, Pardess Hannah, Ha Maapil and Natanya Roanana, and in the south, largely Rehovoth where there is also the major field station for experimentation in citrus by the Ministry of Agriculture.

There are some smaller areas of citrus growth around Gedera and Majdal, the latter less than 10 miles from the Gaza Strip which is in Egypt's control, in the south and around Kurn in the far north. Some citrus dots the southern shore of the Sea of Galilee near Bitaniya and somewhat south of this, also in the Jordon Valley, clustering around Bet Alpha, Bet Ha Shita and Ein Haron are small citrus sections.

The ratios of types of citrus fruit produced in Israel has not significantly changed from the pre-war period except for the greatly increased production of lemons as will be seen in the following table:

**CITRUS FRUIT PRODUCTION IN PALESTINE/ISRAEL, AVERAGE
1935-39 and 1945-9, ANNUAL FROM 1952-3 1955-6
(In thousands of Boxes)**

<u>Variety</u>	<u>Average 1935-39</u>	<u>Average 1945-49</u>	<u>1952/3</u>	<u>1953/4</u>	<u>1954/5</u>	<u>1955/6</u>
Oranges	8,652	8,300	6,373	9,549	7,796	9,419
Grapefruit	1,445	892	1,456	1,539	1,524	1,464
Lemons	88	288	220	295	336	374

Source: U.S.D.A., Foreign Agriculture Circular, July 1956, pp. 5-8. Although Israel's production of grapefruit appears tiny next to U.S. production which averages about 45 million boxes annually since World War II, Israel's production of grapefruit is second in the World only to the United States.

The cost and return picture of Israel citrus was complicated by the explosive inflation¹ which accompanied the mass immigration, war economy and economic development following on the heels of the Declaration of Independence. While the Government of Israel instituted restrictive exchange controls, rationing and a heavy surplus of imports over exports, to attempt to offset inflationary pressures there were never the less gov't deficit budgets, cost plus arrangements with manufacturers and escalator wage clauses tied to the C.O.L. index which

¹The index of wholesale prices in Israel rose to 270 average for 1954 from a base of 100 in 1948, and an average of 1240 in 1954 from a base of 100 in 1936.

Induced further inflation. A series of complicated official further devaluations of currency took place from 1952 on, following the "actual currency devaluations" which had occurred in the preceding period (since the 1949 devaluation to I.L.I.-\$2.80) in the international "free" money market.

Whereas, the pre World War II estimate of investment represented in a dunam of fruit bearing citrus was about L.P. 83,¹ the Ministry of Agriculture in the person of A. Hirsh, Acting Chairman of the Citrus Control and Marketing Boards of Israel in 1953, estimates the average investment required for a dunam of citrus grove at being somewhere between I.L. 500-600. That is, in the understanding of the writer, the cost to an entrepreneur, wishing to determine the marginal efficiency of capital so invested during the early 1950's in citriculture, would vary between I.L. 500-600/dunam. Not that each dunam has cost that much but that each additional dunam brought into bearing presently, all things being equal, would require the stated investment. Leaving the important question of credit institutions aside for the moment, what are the promises of Israel's citriculture which would induce the investment.

¹See page 58 of this paper.

During the 1952/3 season, Dr. E.L. Levie of the Economic Planning Division of the Ministry of Agriculture made a survey of the Israel Citrus Industry based on a sample of 128 groves comprising an area of 3220 dunams.¹ This is the only thorough study of modern costs and return made by the gov't,² but was immediately outdated on the return side of the ledger by the revision in the exchange rate at the end of that season.³ In the following presentation of the findings of this study, the effects of the revision in the exchange rate will be figured in to bring the study up to date:

AVERAGE COSTS/DUNAM (fruit on tree) CITRUS GROVE 1952/3

<u>ITEM</u>	<u>IL</u>
<u>CURRENT EXPENDITURES</u>	
Water	12,300
Fertilizers)	
Manure)	15,600

¹E.L. Levie, "Production, Costs, Profits and Losses in Citrus Groves, "Economic News", Vol. 6, nos. 1-2 April 1954.

²Up to December 1956.

³The exchange rate of 1.3 I.L./\$ was changed to 1.8 I.L./\$ for the citrus exports. This, in effect, meant a 72% increase in return for citrus exports.

AVERAGE COSTS/DUNAM (con't)

Plant protection	3.600
Labor	27.700
Tractors	3.300
Supervision	8.500
Other	<u>6.600</u>
Total Current Expenditures	77.600

INTEREST

Trees	7.000
Land	8.000
Equipment	9.500
Private Wells	<u>2.100</u>
Total Interest	26.600
Depreciation	16.200
Total Costs	<u>120.400</u>

Source: E.L. Levie, op. cit., pp. 32-7

The average dunam of citrus grove alluded to in the above chart produced 82 boxes of which 59 were exportable. The income produced by the sale of this citrus varied according to the market. Thus citrus sold to the processing factories fetched I.L.O. 360/case (or the equivalent of 40 kg.), citrus sold to the local market fetched I.L. 1.400/case plus a subsidy to growers "From the pool of fruit locally marketed to the

pool of exported fruit" of I.L. 25/ton,¹ and I.L. 3.440/case of citrus exported.² The income received by the grower, then, averaged I.L. 202.960/dunam for 59 boxes of export fruit and I.L. 19.400/dunam for 23 boxes of fruit for the local and products markets, or a total of I.L. 222,360/dunam as against an expenditure of I.L. 120,400/dunam fruit on tree. Profits, fruit on tree, for citrus growing during this season were very favorable as a result of the revision of the exchange rate and amounted to I.L. 102/dunam or 16% of net worth/dunam (at I.L. 600 investment plus I.L. 120.4/dunam).

During the following season, 1953/4, costs again began catching up with the prices of the preceding season, and cultivation costs particularly rose owing to more complete cultivation applied during the season than the preceding.

Y. Chorin estimates aggregate income during the 1953/4 season to be about I.L. 38 million. Against this he

¹This subsidy was distributed to the growers through the Citrus Control and Marketing Boards in order to induce greater exports and thereby divert citrus from the local market.

²All of these figures are for case of citrus on tree. The I.L. 3.440/case figure represents the revision of the exchange rate from 1.3 IL/\$ to 1.8 IL/\$, and so the IL 2.000/case of fruit exported given by Levie has been revised upward by 72%.

estimates aggregate expenditures of the orchardist. The following table is based on his estimates.

COSTS OF ISRAEL CITRICULTURE AND MARKETING 1953/4
(I.L. Million)

<u>ITEM</u>	<u>COST</u>	
Water	1.L. 1.5	
Fertilizer and Plant Protection	3.5	
Labor, tractor-work and supervision	<u>8.0</u>	
<u>Total Cultivation Costs</u>		1.L. 13.0
Picking, packing, lifting and supervision	9.0	
Road transport	2.0	
Rail transport	0.5	
Fees, dues, and port loading operations	0.5	
Storage, insurance and administration	<u>2.0</u>	
<u>Total lifting costs</u>		1.L. 14.0
Taxes, interest and amortization	5.5	
<u>Grand Total</u>		<u>1.L. 32.5</u>

Source: Y. Chorin, "The Citrus Industry as a Pillar of Israel's Economy", Economic News, Vol. 6 nos. 1-2, p. 57.

Subtracting, the total expenditure 1.L. 32.5 million from income of 1.L. 38 million leaves profit of 1.L. 5.5 million or 1.L. 42/dunam on the average, that is, a profit of 6% of net worth plus current expenditure.

During the 1954/5 season, the price of Shamuti oranges abroad rose 3 to 4 shillings above the preceding season,

and grapefruit advanced by about 2 shillings/case.¹ Although no clear cut figures have been published for this season, Rokach estimates that even with the decline in production of citrus this year, income to the orchardist is probably the same or slightly lower than the preceding season.^{since.}

At the beginning of the 1955/6 season, citrus growers were very pessimistic about continued good returns. Freight rates for Israel citrus shipped to England were raised from 5 shillings and 4 pence half penny to 6 shillings,² and the apparent rich citrus yields of Spain and N. Africa induced exporters from those countries to reduce the price of citrus fruits by 20-25%.³ However, the severe frosts which occurred in Europe during that season not only ruined most of Spain's citrus crop which had been earlier estimated at a record of close to 50,000,000 boxes, but also severely damaged citrus trees so that they hadn't recovered during the following season

¹ I. Rokach, "The Citrus Season in Retrospect", Israel Export Journal, June 1955, p. 2. During this season Spain suffered freezing weather conditions which damaged the Spanish citrus crop.

² This was part of a general world wide rise in shipping charges. Continental companies also raised their prices by 8-10% Jewish Agency Digest, January 6, 1956, p. 486

³ Jewish Agency Digest, December, 2, 1955, p. 330

when the citrus crop was estimated at 9.5-12.5 million boxes.¹ The consequent short supply of citrus fruit on the European market sent prices higher than had been heretofore registered and made for very profitable years for Israel citrus growers.²

The citrus industry in Israel continues to occupy an important position in the economy as it had during the pre-war period. Citriculture, including new plantings, picking, packing and transport account for 18,000 workers a day during the season,³ at which time most of the unemployed elements in the country find work in the field. Citrus accounted for 20% of the total value of agricultural production in 1953/4 (as against 14% in 1952/3)⁴ and with the increase in prices of citrus during the following years, (except 1953/4 when the total production fell) the importance of citrus in the agriculture of Israel continued to rise.⁵ This rise will probably leap

1 U.S.D.A., Foreign Crops and Markets, July 2, 1956, p.17

2 The relations of Israel citrus prices on the world markets will be more extensively dealt with in the chapter on marketing and Markets. It has been suggested by some observers that Israel growers receive good prices only when Spain's supply of citrus is down.

3 I. Rokach, op. cit., p.3

4 Emanuel Levy, Israel Economic Survey 1953/4, Economic Dept.

5 During the 1954/5, the gross value of the citrus crop totaled I.L. 62,599,000 or about 17% of the gross value of all agricultural production, I.L. 377,405,000. All citrus exports including fresh, processed, gift parcels and citrons reached a value of I.L. 56,296,000 in 1955 or about 37% of total exports I.L. 154,399,000 Citrus exports accounted for about 40% of total in 1954. See Statistical Abstract of Israel 1955/6.

forward after 1957/8 when new plantings begin to bear fruit.

THE ISRAEL CITRUS PRODUCTS INDUSTRY

A new development in the citrus industry since World War II was the rising importance of citrus by products which have become Israel's fourth largest export after fresh citrus, diamonds and automobiles.¹ Although canning and preserving of citrus products began back in 1929 in Ramat-Gan, it didn't achieve any level of real importance until the war when existing facilities in Palestine worked 24 hours a day to supply the Allied troops stationed not only in the Middle East but the entire Mediterranean area and the Far East. Pasteurized orange and grapefruit juices were then the main source of Vitamin C, and the health of the British troops was considered important by the British Imperial Gov't,

The British Ministry of Food adopted a program in the early years of the war to supplement the diet of children under 7 and expectant mothers, and to fortify these with additional amounts of Vitamin C. Palestine seemed a happy choice as a source of supply in so far as it had an abundance of the raw materials and was part of the

¹ U.S.D.A. Foreign Crops and Markets, January 16, 1951, p. 56

*possibilities
of marketing*

sterling area; however, there was a lack of modern "know how" and equipment, only two canneries having a small modern concentrators.¹

By the end of 1944, the ten chief preserve factories joined the Citrus Concentrates Producers Assoc. and sent a delegation to America to study its technique. These delegates also ordered equipment in America during their stay, and by the end of 1945, Palestine had received modern equipment and had an up to date citrus products industry.² It produced orange juice concentrates, pasteurized canned juices, canned grapefruit and orange segments and slices in syrup, essential oils and pulps, fruit cells and peels. The following table shows principal production during the last three war years:

PRINCIPAL PRODUCTS OF THE CITRUS PRESERVING INDUSTRY 1943-45
(In tons)

	<u>1943</u>	<u>1944</u>	<u>1945</u>
Squashes	7,225	4,656	3,829
Pasteurized juices	-----	1,629	3,646
Concentrates	1,226	1,356	1,044
Canned fruit	80	155	327

Source: M. Bejarano, "The Citrus Products Industry", Israel Economist Annual 1949-50, p. 107

¹M. Bejarano, "Israel's Citrus Products Industry", "Economic News". Vol. 6, nos. 1-2

²ibid

The major problem of the Israel citrus products industry is short supply of the raw material,¹ although total output has increased since the war period. In 1946/7, the products industry's output was only slightly more than 6000 tons² more than doubling to 14,000 tons in 1947/8³ and growing substantially since the emergence of the State.

The following table shows the amount and percent of total citrus which was used by products factories in Israel since its independence:

FACTORY UTILIZATION OF CITRUS CROPS 1948/9-1954/5

<u>Season</u>	<u>Amount In Tons</u>	<u>Percent of total Citrus crop</u>
1948/9	75,671	30
1949/50	49,362	20
1950/1	102,136	31
1951/2	103,747	33
1952/3	64,500	18
1953/4	90,600	19
1954/5	44,000	17

Source: Statistical Abstract of Israel 1954/5, pp.98-9
 I. Rokach, "Hundred Years of Citrus Growing in Palestine" "Loc. cit. pp. 16-17 and" The Citrus Season in Retrospect, loc. cit. p.3

¹Aside from competition from America's giant industry which was granted export premiums of about 70% by the U.S. Gov't up to 1954/5, when Mediterranean citrus growers protested and the U.S. Gov't subsequently cancelled premium payments for U.S. citrus products shipments to the United Kingdom.

²S. Bejarano, "The Citrus By-Products Industry, An Important Asset of Foreign Trade" Palestine Economist Annual 1948, p. 107

³S. Bejarano, "The Citrus Products Industry", Israel Economist Annual 1949-50, p. 214

During the last year registered in the table above, citrus products were so short that "as a consequence the factories were not in a position to deliver the entire quantity of citrus concentrates which they had contracted to supply the Ministry of Food in the U. K." ¹ The quantities of citrus allocated to products factories is not only dependent upon total crop and demand, but also on the quality of the crop produced during a particular season. When weather conditions are not ideal, fruit may develop with blemishes on the peel or particularly rough or misshapen, these are usually culled out and sent to the factories, if the interior of the fruit itself is satisfactory. Fruit infected with disease or pests or dried out are not utilized by the factories.

Almost all of Israeli citrus products are exported, England being the major market and taking more than 75% of the total, except the residue of the peels which are shredded for fodder, and the sugar of which is fermented into alcohol.

Presently aside from concentrates, squashes, pasteurized juice, essential oils, and canned fruits, the citrus industry of Israel also produces "orange crush" a new

¹ I. Rokach, op. cit., p.3

orange drink which is produced by crushing the entire fruit and retaining its vitamins and natural flavor to the fullest, medicinal compounds such as hesperidin and naringin which the U.S. imports from Israel and frozen orange concentrates.¹

ISRAEL ORGANIZATION OF CITRUS PRODUCTION AND DISPOSAL

In 1927, the Mandatory Gov't attempting to bring order to the citrus industry, promulgated the Citrus Fruit Ordinance which regulated the size of the box to be used for export, the number of fruits per box, fixed picking and export dates, controlled use of trade brands, and provided for inspection as to quality, maturity, disease and pests. It also provided for the appointment of the Citrus Fruit Committee which was to consist of a government officer as chairman, two representatives from Great Britain, seven Arabs and seven Jews. This committee had the responsibility to organize the fruit inspection service, oversee the improvement of shipping facilities, building of storage units at railroad stations and ports, advertising, research into wastage of fruits and fumigation of groves, etc.²

¹See "The Citrus Products Industry of Israel," and "Frozen Juice," The Israel Export Journal, May 1956 and U.S.D.A. op. cit., January 16, 1956, p. 56

²B. D. Weinryb, op. cit., p. 40.

The Jews previous to this had some history of organization. As early as 1900, the Pardess Cooperative Society of Orange Growers had been founded, and this remained the largest organization.¹ In 1926, a joint venture occurred whereby the Merkaz Pri Hadar (Citrus Fruit Center) was founded in which both cooperatives and private merchants took part. However, its purposes were defeated by internal competition.² The Jaffa Orange Syndicate then was formed to become the central organization of four citrus growers cooperatives. In 1929, the Jaffa citrus exchange was founded by Jewish Cooperatives and citrus exporters to negotiate for shipping space, develop a more efficient marketing system and advise on advertising.³

In 1938, another joint venture, Semel, for the purpose of shipping abroad, was established. In so far as this organization didn't include all of the Jewish shippers, it could hardly have been successful. The Arab sector was much more divided. The merchants approached the hundreds and there was no effective cooperatives. Generally, the large orchardist was also the merchant, selling

¹ Ibid

² Sefer Hakalkala, p. 273

³ Weinryb, p. 40

not only his own produce but that also of the smaller orchardist whose produce he purchased in a forward market several months in advance of harvest. This fruit was generally sent to the English market with not the slightest semblance of standards.¹ Weinryb concludes, "the reputation of Palestine citrus on the European market suffered and sales possibilities were consequently reduced."²

In October 1940, the Citrus Control Board was appointed under the Emergency Regulations of the Mandatory Gov't. Following this, the Citrus Marketing Board was formed. The Gov't created Citrus Control Board consisted of a British chairman, two official members and eight producers-four Arabs and four Jews. The Citrus Marketing Board consisted of two official members, one acting as chairman, and four members of the industry. These boards secured loans for growers and marketed whatever produce it was possible to grow. The Control Board levied taxes on all citrus sold in the local market. This brought in only L.P. 52,436 in 1940/1 and L.P. 131,902 in 1941/2. These taxes paid the expenses of the board and permitted a surplus which was distributed to the growers in

¹Sefer Hakalkalah, p. 274

²Weinryb, p. 40

proportion to the size of their groves. Acting through the board, the Mandatory Gov't purchased 8000 tons of citrus in 1942/3 to distribute at low prices to the population. In 1943/4 close to a half million boxes were shipped to Great Britain and about 600,000 cases were sold to the armed forces.

During the war years the board distributed L.P. 4,000,000 as Gov't loans to orchardists for the purpose of helping maintain the groves in produceable condition.¹

Arab politicians were opposed to the boards from the beginning and urged Arab orchardists not to sit on them. Some Jewish members objected to the method of dividing the orders; others demanded the abolition of the boards in favor of free marketing.²

After the war, the linking system which existed whereby each grower in the country was tied to a panel of approved "exporters", for the shipment of his crop for one season was centralized in the Citrus Marketing Board. In the Arab sector, the thirteen approved "contractors" (composed of 58 "exporters") were entrusted by way of commission and/or by way of firm sales with the disposal

¹Weinryb, p. 40

²ibid

of the crop. In the Jewish sector the thirteen approved "contractors" (composed of 30 "exporters") were similarly entrusted with the disposal of their crop. While the individual contractor shipped his quantity in proportion to the variety of fruit he held, adjustments were made monthly in such a way that when the season ended, each sector (Arab and Jewish) was to have shipped an equal quantity of cases of all the varieties of citrus produce combined, "provided they both (sectors) disposed of an even quantity of exportable fruit."¹

Since the establishment of the State of Israel, the Gov't has undertaken the regulation of all purchases of material and all sales of fruit both locally and abroad through the parallel boards.² The Israel Minister of Agriculture acts as chairman and the Ministers of Finance and Commerce serve as official members of the boards.³ The other members are representatives of citrus growers. Each year three members, two from the Citrus Marketing Board and one from the Citrus Control Board, go abroad

¹ I. Rokach, "Marketing of Citrus," Palestine Economist Annual 1948 pp. 159-60

² M. H. Sachs, "70 Years of Citrus Industry" London Jewish Chronicle Supplement, Jan. 30, 1953, p.2

³ A. Arnon, "The Citrus Control and Marketing Boards," Israel Export Journal, May 1956, p. 18

to negotiate sales of the crop and to supervise connections with the Board's offices abroad. These offices operate in London, Brussels, Rotterdam and Stockholm.

The Board contracts the national shipping company, Zim, and foreign shipping companies to ensure provision of adequate facilities for the transport of Israel citrus to its proper destination. It negotiates prices and guarantees supplies also to the products industry. It purchases, receives, stores, prepares and distributes the materials necessary for citriculture and harvest. It gives financial aid to institutions dealing with citrus research. It advises on the eradication of citrus disease and pests and on protection of fruit against decay after harvest. It generally represents the citrus industry in negotiations with official groups, trade unions, railways and port authorities.

Perhaps its most important function is in the realm of financing. The board aids in the finance of pre season purchases of packing materials (and carry overs from the preceding season), out-of-pocket expenses of growers for F.O.B. Delivery of fruit immediately following shipment, the construction of centralized packing houses and the purchase of mechanized equipment through disbursement of prepayments and negotiation of loans.

Handwritten notes:
...
...
...

The availability of credit facilities for citrus growers in Israel, however, is not adequate to the need.¹ The remaining expenditures over the course of the season must be provided by the citrus growers through their own resources or more likely through negotiation of individual loans. The Israel Bank of Agriculture, which the gov't established in 1951, has granted some credit to citrus growers which can be paid over an 8-9 year period at an annual rate of 5%. Local banks and organizations advance loans on fruit on tree for lifting expenses occasionally, but in the majority of cases the growers must rely on their own resources. These are frequently not enough and the Citrus Marketing Board has tried, increasingly, to meet the growers requirements from advances on proceeds of sale.

Dr. Liwni, in his study, concludes that the credit facilities of the country are not able to supply the needs of a growing industry particularly in the medium and long-term for the expansion and development of existing and new groves and the further creation of centralized packing houses. He, therefore, suggests, the development of agricultural mortgage banks, which are unlikely

¹See M. Liwni, "The Finance Problems of the Citrus Industry," Economic News, Vol. 6, nos. 1-2

owing to the great shortage of capital. Whereas additional short-term credits are expected to be placed at the disposal of the citrus industry in the near future from foreign banks, the continuing shortage of longer term loans is likely to plague the industry during its entire period of development.

CHAPTER V

LEBANON, CYPRUS AND OTHER MIDDLE EASTLEBANON

Lebanon bounds Israel's northern border and shares with Israel much of the eastern coastline of the Mediterranean Sea. Its eastern and northern borders touch Syria, its most important customer for citrus as well as other products. Lebanon is a small country of less than 4000 square miles,¹ with an approximate population of 1.2 million.² Only 1000 sq. miles are cultivated including the formidable terracing of its mountainous terrain. The major agricultural districts are the coastal plain and the Bekaa plateau in the central to south east of Lebanon. These are the intensive cropped areas; there are also cropped areas mainly in the form of fruit trees and vines on the slopes of the country. About one-third of the cultivated area is devoted to fruit, vegetables and some industrial crops.³ The citrus areas are found in the north centering around Tripoli where the approximate acreage is estimated at 7,907 acres; in the Mount

¹ I.A.C., Report of the U.S. Lebanon Agricultural Mission, O.F.A.R., U.S.D.A., Wash. D.C. Sept, 1948, p. 4

² As of 1951, A. Cohen, Ha Mizrah HaArvi, (Hebrew) Workers Library, Israel 1955, p. 22

³ I.A.C., op. cit., p. 5

Lebanon area centering around Antelias and Beirut where approximate acreage is estimated at 4,386; and in the south centering around Tyre and Sidon where approximate acreage is estimated at 4,263 acres.¹ Thus in 1950/1, Lebanon had a total of an estimated 16,556 acres or approximately 66,225 dunams devoted to the cultivation of citrus.

A very rough estimate for area devoted to the major citrus varieties is as follows:

ESTIMATED CITRUS AREA AND VARIETY 1950/1

<u>Variety</u>	<u>Area (dunam)</u>	<u>Per Cent of total</u>
Sweet oranges	45,000	67
Bitter oranges	3,000	4
Tangerines	4,000	6
Sour Lemons	15,000	23

Source: J. H. Burke, op. cit., p. 2

The U. S. Agricultural Mission believes that it is possible to double the present cultivated area of Lebanon and to quintuple the irrigated area which at present covers about 100,000 acres.² The important rivers

¹ J. H. Burke, A Study of the Citrus Industry of Lebanon cit. p.3

² I.A.C. op., cit., pp. 14-15

12N
1622
per year
1122
2830

flowing through Lebanon include the Litani, flowing through the Bekaa and emptying into the sea in the south between Sidon and Tyre, the Orontes which Lebanon shares with Syria and which empties into the sea southeast of Antioch; the Kabir which flows through the Plain of Akkar; the Barid near Tripoli; the Kadisha which empties into the Mediterranean at Tripoli; the Jowz, Ibrahim, Kalb, Damour and Barouk rivers which also are not sufficiently utilized plus the numerous flood waters which empty into the sea with much of Lebanon's scant top soil. Any appreciable use of these waters for the purpose of irrigation could easily be used in the further development of an expanding citrus industry which could make Lebanon a serious contender for pre-dominancy in the field.

Citrus fruit production has expanded considerably since the pre World War II period, doubling itself from that period to 1950/1 and rising slowly since then, as will be seen in the following table which represents an estimate of total production of citrus fruits in Lebanon since 1927:

CITRUS FRUIT PRODUCTION 1927-30 AVERAGE
1934-8 AVERAGE 1941-4, 1947/8-1954/5
 (In metric tons)

<u>YEAR</u>	<u>QUANTITY</u>
1927/30 annual average	38,000
1934/8 " "	45,300
1941/2 " "	55,000
1942/3 " "	49,440
1943/4 " "	46,350
1944/5 " "	63,500
1947/8 " "	64,000
1948/9 " "	48,000
1949/50 " "	85,000
1950/1 " "	92,000
1951/2 " "	100,000
1953/4 " "	100,000
1954/5 " "	115,000

Source: based on correspondence with S.B. Himadeh, Professor of Econ. University of Beirut, Empire Marketing Board, Fruit, A Summary of Figures of Production and Trade, London 1933. p. 26 and F.A.O. Prod. 1955, Rome 1950, pp. 70-1

Domestic consumption has accounted for about 1/3 of Lebanon's citrus crop during recent years. Only a small portion of its citrus crop is processed. The citrus products industry utilizes mainly the bitter orange for making marmalade, orange peel candy and preserves. The blossoms are distilled into an essence and some are candied and used on sweets. Although some juices are processed from sweet fruit, the presence of the Mediterranean fruit fly in very great numbers militates against the production of quality juices and concentrates because of the appearance of larvae and maggots in the juice.

Lebanon's leading export variety is the Shamuti as in Israel. Tangerines and lemons are also exported, but these mainly to Syria and other Middle East states while some are also exported to Europe. Syria usually takes 1/3 of Lebanon's citrus crops has been the major purchaser of Lebanese fruit,¹ but the squabbles which arise every few years between these two neighbors, and the on again off again nature of the customs union which exists between the two, make citrus orchardists insecure in their reliance on Syria. Exports to the rest of the world also account for about 1/3 of Lebanon's total citrus crops. In recent years Lebanon has sought to extend her area of export in Bahrein, Egypt, Jordan, Kuwait and Saudi Arabia. France because of past relations with Lebanon and because of the currency convertibility which exists between the two had been an important customer. Czechoslovakia in 1950 entered into a bilateral trade agreement with Lebanon and has been for the past few years an important customer.

West Germany and the U.S.S.R. have recently concluded agreements with Lebanon and promise to be important

¹Transport of citrus to Syria has the advantage of being sent in bulk, thus reducing the costs of packing and packing materials as well as handling.

customers. Thus, the W. German Gov't allocated D.M. 5.67 million for the import of Lebanese oranges and lemons for one year up to March 11, 1954,¹ and Russia has made a trade agreement with Lebanon providing for the export of citrus and other fruit in exchange for Russian wheat and timber.² (Syria has been the supplier of Lebanese wheat requirements.)

The following table represents the exports of oranges and lemons from Lebanon (excluding Syria) from 1944/5-1954/5, other varieties including grapefruit and tangerines are not counted but have been increasing slowly in recent years:

ORANGE AND LEMON EXPORTS 1944/5-1954/5
(In boxes)³

<u>YEAR</u>	<u>ORANGE</u>	<u>LEMONS</u>
1944/5	0	4,380
1945/6	0	6,643
1946/7	36,060	76,523
1947/8	45,289	16,418
1948/9	178,825	32,779
1949/50	109,852	35,274
1951/2	1,135,000	236,000
1952/3	974,000	287,000
1953/4	820,000	233,300
1954/5	1,216,600	323,300

Source: J.H. Burke, op. cit., pp.20-1, U.S.D.A. Agricultural Statistics, 1953 Wash. 1954, pp. 184-5 and F.A.B. Trade and Commerce 1955, Rome 1956, pp.91-5

¹M.E. Economist, V. 7 no. 11, November 1953, p. 11

²M.E. Mirror W.S., no. 37, Cairo, Jan. 23, 1954, p. 14

³Boxes are estimated at 30 kgs. instead of the larger Israeli box and hence are actually only 3/4 the size of the Israel box.

Export of the Lebanese product increased tremendously following the large increase in production during the 1951/2 season. Future expansion of Lebanese export and therefore of production is dependent upon the competitiveness of the Lebanese product and the general organization of the Lebanese industry except in the case of dealings with the communist bloc which pursues trade more for political than for economic reasons.

As in all of the citrus industries of the Middle East with the partial exception of Israel, complete studies of the cost-return structures are totally lacking. There is a dearth of even the most primitive statistics in this area. However, during the 1950/1 season, the U.S.D.A. Marketing Specialist, J.H. Burke, went to Lebanon and Cyprus to study their citrus industries.¹ These are the latest studies available, and although quite incomplete, there are a number of interesting observations which will be here translated into terms similar to those used for the chapter on Israel.

¹ See J. Henry Burke, A Study of the Citrus Industry of Lebanon, U.S.D.A., Foreign Agricultural Report no. 58 May 1951, and J. Henry Burke, Observations on the Citrus Industry on Cyprus, U.S.D.A. Foreign Agricultural Circular, April 6, 1951.

While most groves in Lebanon are not given optimum care, those which are, produce about 66 cases of citrus fruit/dunam, this much below the estimate for the average grove in Israel. Groves which do not receive optimum care, that is the majority, produce about one half the number of cases of the better managed groves. Labor costs are low and even without the presence of the labor offered by Palestine refugees there is an abundance. The current price for cultivation labor is about 3-4 Lebanese pounds/day or about \$1.00. Women in packing houses earn, one half of this amount, and labor involved in more arduous and skilled pruning receive about 6 pounds/day or about \$1.30/day. The following table represents the estimated costs/dunam in 1950 of the well cared for citrus grove:

ESTIMATED COST OF OPERATION OF ONE DUNAM OF CITRUS GROVE
(Lebanese Pounds)

<u>ITEM</u>	<u>COST</u>
Cultivation ¹	105
Nitrates	4
Manure	10
Taxes	2.5
Pest Control:	
Oil Spray once a year, rent of machine and material	4
Labor	8

¹One man can cultivate about 10 dunams of citrus grove during the course of a season.

ESTIMATED COST OF OPERATION (con't)

Lime sulphur spray twice a year, 60 pounds application, labor and material	12
Irrigation:	
Labor	4.2
Water	2
Other Costs	<u>10</u>
Total Lebanese pounds	161.7
Total U.S. Dollars	18.2

Source: J.H. Burke A Study of the Citrus Industry of Lebanon, Loc. cit., p. 27

The cost per box of Shamuti, fruit on tree, then, on the well tended grove approximated about \$.71 while the cost for this and other varieties approximated about \$1.43 for the less well tended grove in Lebanon at this time.¹

Harvesting costs in Lebanon tend to be quite low. The following table represents the costs of picking and packing operations per box of citrus fruit during the 1950/1 export Season:

¹The cost/box of Shamuti in Israel fruit on tree during the 1952/3 season in the average grove (not including interest and depreciation which are not figured in the above estimates for Lebanon) is IL0. 900 (IL 77.600 current expenditure/dunam 82 boxes/dunam) or about \$.50 (at 1.8 I.L./\$). Furthermore the Lebanese box of shamuti is only about 3/4 the size the Israeli box, 30 kg.: 40 kg. Therefore, the Israeli product can be considered to be about 50% as costly as the Lebanese product fruit on tree (current expenditures only). This is largely owing to the superior production of the Israeli dunam, 82 (40 kg. boxes) dunam: 66 (30 kg. boxes) dunam. When Burke made his study, the new exchange rates were not in effect in Israel, therefore he believed the Lebanese cost structure favorable to Israel's.

ESTIMATED PICKING AND PACKING COSTS/BOX EXPORT ORANGES
(Lebanese Pounds)

<u>ITEM</u>	<u>COST</u>
Box	1.25
Paper straps	.35
Chestnut straps and nails	.15
Picking, transport to packing house, cleaning, sizing, wrapping, packing, labor	1.00
Truck transport to port	.25
Lighterage from dock to ship and port taxes	.45
Other costs	<u>.05</u>
Total costs Lebanese pounds	3.50
Total costs U.S. dollars	.97

Source: J. H. Burke, op., cit. p. 28

Thus, total costs/box of export oranges ranges from \$1.68 for the well tended grove to \$2.40 for the less well-tended grove.

Burke observes that in 1950/1 these prices compared well with other Mediterranean producers, but the problems of decay, lack of standards and general disorganization in the citrus industry of Lebanon were apparently prohibiting the possibility of expansion of production and exports, and that the orchardist of Lebanon at this time were making no real effort to correct the situation.¹

¹J.H. Burke, op. cit., pp. 25-9

Cyprus

Cyprus is an island in the eastern Mediterranean lying about 40 miles off the coast of Turkey and 60 miles off Syria. The population of this tiny island crown colony of Great Britain is about 500,000. Cyprus occupies an area of 3,572 sq. miles, about 65% of which is cultivable.¹ Much of Cyprus is low-lying and its citrus groves therefor tend to be on ground lying usually less than 100 feet above sea level. The most important citrus district center around Famagusta and Salamis on the eastern coastal plain, the second area of importance lies near Limassol centering about Epilkopal in the southwest of Cyprus and in the northeast, off the Morphov Bay are two lesser citrus districts.²

The climate of Cyprus like other Mediterranean climates is mild with rain falling mainly in the winter months, Nov-March falling hardest in Dec.-Feb. The citrus areas receive an average of 17 inches of rainfall in these months. Although the Khamsin in Cyprus also is a hazard, Cyprus receives heavier damage in the Spring winds than is to be found in Israel or Lebanon. Frosts also occur

¹R.I.K.A., The Middle East, Oxford U. Press, London, 1954, p. 138

²J.H. Burke Observations on the Citrus Industry of Cyprus, Loc. cit., p. 1

here more often than in the other two areas.

Burke observed that the cost of producing citrus in Cyprus was more favorable than in Israel owing to the rapid rise in labor and material costs in Israel since independence. The cost of operating a commercial citrus grove was estimated at 50 sterling pounds/acre/year or \$35.00/dunam during the period of his visit, 1950/1.¹ Most of the citrus grown in Cyprus, particularly the Shamuti orange and lemons are slated for export.

Cyprus's commercial production of citrus began about the turn of the twentieth century, although the first estimates of production were made in 1912 when Cyprus produced about 15.5 million oranges and lemons.² In the early 1920's orange production was estimated at about 200,000 boxes/year.³

Exports during these early years went mainly to Egypt and Greece. Egypt has remained an important customer of citrus from Cyprus in spite of her own larger production.

¹ J.H. Burke, Observations on the Citrus Industry of Cyprus loc. cit., pp.6-18

² Wallschlaeger, op. cit; p. 14 These should be figured at 200 oranges/box and 300 lemons/box. Much of the data on Cyprus citrus is expressed in terms of individual fruits, rather than tons or boxes, henceforth all such data is translated into terms of boxes at the above rate.

³ Moriarty, op. cit; p.30

In 1930, Cyprus produced about 1.25 million boxes of oranges and from 34,000 to 50,000 boxes of lemons with Egypt and Greece still remaining the chief customer.¹ During the 1930's the chief outlets for Cyprus citrus swung to the United Kingdom and Scandinavia which still remain its more important customers, along with West Germany. However, during the 1930's owing to careless packing and ensuing decay, Cyprus met with increasing marketing difficulties.² Following the war years, Cyprus's packing methods were considerably improved.

The following table represents the growth of Cyprus production during the 1930's the decline during the years of World War II and the ensuing growth of production again when the Mediterranean opened. During this latter period data on grapefruit production was for the first time made available.

¹Webber, op., cit.; p. 99

²Wolfert, op., cit; p. 7

PRODUCTION OF ORANGES, LEMONS AND GRAPEFRUIT, 1932/3-1954/5
(In boxes) ¹

<u>YEAR</u>	<u>ORANGES</u>	<u>LEMONS</u>	<u>GRAPEFRUIT</u>
1932/3	198,414	25,200	
1933/4	166,920	40,940	
1934/5	229,900	28,345	
1935/6	236,200	37,790	
1936/7	289,750	59,840	
1937/8	426,750	66,138	
1940/1	400,000	63,817	
1941/2	250,000	52,214	
1942/3	300,000	43,512	
1943/4	325,000	75,421	
1944/5	368,792	60,917	67,197
1945/6	317,349	124,734	60,000
1946/7	644,306	163,807	80,000
1947/8	441,673	125,990	158,956
1948/9	554,166	129,541	145,594
1949/50	437,430	109,786	158,936
1951/2	754,000	147,000	193,000
1952/3	691,000	169,000	190,000
1953/4	986,000	167,000	
1954/5	807,000	153,000	

Source: Wulfert, op. cit.; p. 7; J. H. Burke, op. cit; p. 5; U.S.D.A., Agricultural Statistics 1953, Washington, D.C. 1954, pp. 177-8, and U.S.D.A. Foreign Agricultural Trade, Wash D.C. 1956, pp. 85 and 89

As the production rose during the 1930's and declined during the war years, so did exports rise and decline but even more dramatically. Exports did not achieve pre-war levels until 1948 when partly owing to the decline in Israeli production and exports, Cyprus exports rose rapidly, mainly to the United Kingdom.

¹ about 30 kg. weight or 3/4 the size of the Israeli box.

The following table represents annual average citrus exports during 1925-9, 1930-3, 1935-9, 1940-4, and annually from that date on.

**EXPORTS OF CITRUS FRUITS, AVERAGE 1925-9, 1930-3, 1935-9
1940-4 (and ANNUALLY 1945/6-1954/5)
(In thousand boxes) ¹**

<u>YEAR</u>	<u>ORANGES</u>	<u>LEMONS</u>	<u>GRAPEFRUIT</u>
1925-9 average	82	7	
1930-3 "	95	6.5	
1935-9 "	213	33	
1940-4 "	28	1.5	6
1945/6 "	112	19	44
1946/7 "	197	36	58
1947/8 "	229	26	145
1948/9 "	307	6	130
1949/50 "	397	43	133
1950/1 "	530	67	112
1951/2 "	698	73	140
1952/3 "	639	81	137
1953/4 "	613	93	167
1954/5 "	650	70	180

Source: Bodenheimer, op. cit., p. 611, Burke, op. cit., p. 13, Ag. Stat. 1953, op. cit., pp 183-5, F.A.O. 1955, op. cit., pp. 91-5

Cyprus's small citrus products industry manufactures chiefly essential oil of lemon for its own perfume industry.

Juices and squashes are made on a small scale for local consumption.

Egypt

Egypt occupies an area of 363,000 sq. miles, but only

¹about 30kg. weight or 3/4 the size of the Israeli box.

13,000 of these are irrigated and cultivated.¹

Principal cultivation of citrus occurs between 25 and 31 degrees north latitude, immediately south of the Mediterranean. The climate is tempered by the warm waters of the sea which permits a mean temperature for January and February of between 55-57 degrees. Frosts occur only at intervals of 8-10 years and are rarely sufficient to harm the citrus trees.²

Commercial production of citrus didn't begin until the 1920's when plantations began shifting from orange trees grafted on the Tronj (citron) to the Naranj (Seville Bitter.)³ In the early stages of commercial production in Egypt, there were more than 50 varieties cultivated.

During the 1955/6 season, 14 major varieties were cultivated with the Balady orange, Mandarine, Soukary (sweet) orange, Naval orange and Balady lemon predominating as will be seen in the following table:

¹R.I.I.A. op. cit., p. 163

²Webber, op. cit., p. 111

³T.W. Brown, The Propagation and Cultivation of Citrus Trees In Egypt Revised by Abbas al-Sawy, Gov't Press, Cairo, 1935

VARIETIES, AREA AND YIELD OF EGYPTIAN CITRICULTURE 1955/6

<u>VARIETY</u>	<u>AREA (feddan)¹</u>	<u>YIELD (metric ton)²</u>
Oranges		
Belady	17,668	133,736 (4,820,000 boxes)
Naval	7,194	36,767 (1,020,000 boxes)
Soukary	4,386	24,549 (710,000 boxes)
Khalile	888	5,722 (160,000 boxes)
Blood	720	4,207 (120,000 boxes)
Valencia	619	3,947 (115,000 boxes)
Jaffa (Shamuti)	607	3,733 (110,000 boxes)
Naranj (Sour)	313	1,078 (30,000 boxes)
Yusuf Suliman	132	729 (20,000 boxes)
Lemons		
Belady	8,380	38,005 (1,100,000 boxes)
Sweet	771	4,805 (240,000 boxes)
Italian	340	554 (13,000 boxes)
Mandarin	11,667	80,110 (2,400,000 boxes)
Grapefruit	113	666 (15,000 boxes)
TOTAL	96,012	511,998 (11,775,000 boxes)

Source: based on correspondance with Dr. Ahmed Hamed el-Nasharty Director, Extension Service, Horticultural Dept., Egyptian Ministry of Agriculture, letter dated March 18, 1957.

Production of citrus has increased in Egypt following such the same pattern as the rest of the Middle East, except for the cut back that occurred in the other countries during World War II was not nearly as severe in Egypt because she disposes of virtually all her citrus locally. The following table traces the growth of citrus production in Egypt from the 1920's to the 1954/5 season:

¹The Feddan equals 1.083 acres or slightly more than 4 dunams.

²A metric ton is equal to 1000 kilograms. An average box of oranges weighs about 34 kilograms, and an average box of lemons weighs about 30 kilograms. The figures in parentheses in this column are approximations of the numbers of boxes produced.

ESTIMATED PRODUCTION OF CITRUS IN EGYPT
(In thousands of boxes)¹

<u>SEASON</u>	<u>ORANGES AND MANDARINE</u>	<u>LEMONS AND LIMES</u>
1922-6 (annual average)	800	n.a. ²
1927-31 " "	1,000	n.a.
1932-4 " "	1,900	n.a.
1935-9 " "	6,400	1,281
1945-9 " "	6,700	1,062
1950/1 " "	8,900	1,085
1951/2	8,300	1,090
1952/3	9,700	1,100
1953/4	10,800	1,233
1954/5	9,500	1,200

Sources: Agricultural Statistics 1953, 1956; World Fresh Fruit, op. cit, p. 33; Wulfert, op. cit., p. 40 and Webber, op. cit. p. 121

Egypt utilizes the Naranj (sour orange) and grapefruit in making jelly and grapefruit sections in her small local products industry.

Dr. Ahmed-Hamed el-Nasharty³ estimates that in the 1955/6 season it cost an estimated L.E. 70 to cultivate a feddan of citrus and that the sale price of the fruit approximated L.E. 170, leaving a return of L.E. 100/feddan fruit on tree. This is about \$280/feddan or \$70/dunam.

During the 1930's the Egyptian Gov't sought to encourage an export of citrus. They, therefore, instituted during

¹ in 30 kg. boxes or 3/4 the weight of the Israeli box

² data not available

³ op. cit.

the 1933/4 a five year plan calling for the payments of export bonuses. During 1933/4 almost L.E. 4000 was paid out in export bonuses. By 1937/8, L.E. 38,000 was paid out in export bonuses and the Ministry of Commerce and Industry was obliged to ask for an extension of the export bonus plan in April 1939 and obtained L.E. 75,000 to cover increased exports, particularly to Germany, during that year. Egyptian export of citrus increased during the six year period from a total export value of L.E. 6399 in 1933 to L.E. 63,700 in 1938.¹ It will be noted that the total value of citrus export during that period just about equalled the payments provided by the government through its export bonus plan.

Since the war, although Egypt exports small quantities of citrus fruit (less than 10,000 boxes almost entirely to foreign ships stores and valued at less than an average of L.E. 5000 between 1948 and 1954), she has imported several hundred thousand boxes of citrus annually largely from the Gaza Strip (since 1948), Cyprus, Lebanon and sometimes Italy. The value of citrus imports has reached about L.E. 150,000 annually, on the average in

¹ E.C. Empson, Report on Economic and Commercial Conditions in Egypt, Dept. of Overseas Trade, H.M.S.O. London 1939, pp. 58-9

recent years.¹

OTHER MIDDLE EAST

In Turkey citrus is grown commercially in four separate maritime plains: Cilicia and Antalya on the southern shores, the Aegean maritime plain and the eastern corner of the Black Sea shore.² While the Turkish climate is favorable for citriculture during the summer months, in the spring the Foehn winds from the Taurus play a similar role to the Khamsin in other Middle Eastern states. In winter all citrus is in constant danger of freezing.

The local orange (Balady) is a thin-skinned variety similar to the Fanzawi of Israel. It was originally introduced from Algeria. The Shamuti was introduced in the late 1930's and its production has increased because of the higher prices it brings on the local market. Other common varieties in Turkey are lemons, mandarins and the Turunj (citron).³

Turkey during the 1930's had an annual average production

¹ Egypt Ministry of Finance and Economics, Annual Statement of Foreign Trade 1954, 1953, 1952, 1950-1 and 1948-9 Gov't Press, Cairo.

² Webber, op. cit., p. 112 and Bodenheimer, op. cit. p.165

³ Ibid

of about one million boxes (30kgs.) of oranges. This increased to about 1.5 million during the late 1940's and increased again to about two million by 1950.¹ During the 1954/5 season, new plantings in Turkey reaching the fruit bearing stage raised orange production to 4,700,000 boxes. Lemon production increased from under 100,000 boxes in the 1930's to 900,000 by 1954/5.²

Although Turkey is not an important net exporter of citrus, marketing abroad in 1954/5 about 200,000 boxes,³ she has a history of export going back to the pre-World War I period, going chiefly to Black Sea ports.⁴ Almost all of the domestic production is consumed locally, T.C.A. Muntze suggests that since there is not yet much of an attempt at standardization, nor properly organized packing, a great deal of education must be given the farmers before any large trade can be developed.⁵

Syria grows some citrus locally (about 100,000 boxes)⁶ but is largely dependent on Lebanon to supply her needs.

¹Offic Central de Statistique, Annuaire Statistique 1952, Republique Turque.

²F.A.O. Production 1955, pp. 70-1

³F.A.O. Trade and Commerce 1955, pp. 91-4

⁴Wallschlaeger, op. cit. p. 50 and Moriarity, op. cit. p.30

⁵T.G.A. Muntz, Turkey, Economic and Commercial Conditions, Philosophical Library, N.Y. 1951, p. 54

⁶F.A.O. Production 1955, p. 70

Iraq grows citrus locally, and though she cannot satisfy domestic demand, imports of citrus are forbidden lest domestic plants become infected. The absence of many important citrus pests in Iraq is a favorable factor for the expansion of domestic cultivation. The local orange, particularly in central Iraq is very similar to the Egyptian Beladi variety, small thin and smooth-skinned, seedy and sweet. The sweet lemon is often served in Iraq as a table fruit, while limes are much in use for drinks and the dried fruit is used frequently in the Iraqi kitchen for flavoring. Lemons, tangerines and pomelos are popularly cultivated and the grapefruit has been recently introduced.¹

The number of citrus fruit bearing trees in Iraq between 1953 and 1955, stood at 1,293, 592 orange trees, 332,636 sweet lemon and 181,752 sour lemon trees. If figured at an average of 70 trees/dunam, Iraq's present citrus fruit bearing area can be estimated at under 25,000 dunams.

It is expected that Iraq citriculture will increase at an accelerated pace in the near future since the inauguration of the sale of citrus plants by the Experimental Farms of the Iraq Dept. of Agriculture in 1948. Sales of these citrus plants have increased from 1,824 in 1948

¹Bodenheimer, op. cit., pp. 625-7

to 15,914 in 1952 (last year data is given).¹

Citrus is cultivated in Arabia and Iran over extended areas in sections of low altitude where irrigation water is available. Production is for home use and local markets generally, although Iran has from time to time exported all varieties of citrus fruits in small quantities (less than 100,000 boxes) to the U.S.S.R. Iran, during the 1930's produced an annual average of 500,000 boxes of oranges. This increased to 1.5 million during the 1940's and subsequently slipped down several hundred thousand in the 1950's.²

¹Gov't of Iraq, Ministry of Economics, Statistical Abstracts 1948 to 1955.

²F.A.O. Production, 1955, p. 70 and Trade 1955, p. 92

CHAPTER VI
MARKETING AND MARKETS

MARKETING

PACKING

The first step in marketing produce lies in its packing. This operation can be costly, inefficient and detract from the saleability of the fruit, or it can efficient and enhance the saleability. I.D. Ophen, head of the citricultural section of the Israeli Ministry of Agriculture cites the criteria for efficiency in packing operations as follows:¹

Given the output and the required capitalization, the establishment of centralized packing houses, helps decrease the cost per unit. The location of these packing houses, however, must be in proximity of the groves in order to minimize hauling and storing costs and it must also be in the vicinity of labor and transport.

There is a railway which terminates at Haifa Port; the packing houses which use the Haifa Port, therefore, must be located near the railroad. Those cases of

¹I.D. Ophen, "Centralized Packing of Our Citrus Fruit" Economic News, April 1954, pp. 51-2.

fruit destined for Tel-Aviv Jaffa Port must be located near a main road leading to this port (since there is no railway termination at this port.)

Centralized packing houses effect greater standardization of product and therefore, enhance the saleability of the product as well as permit simpler operation of fruit inspection services which in Israel is controlled by the Citrus Control Board, and which issues each season instructions covering, among other things, dates for commencement of export, sanitary packing, wrapping and disinfection processes, measurement and counts of fruit per box, etc.¹

At the end of World War II, there were more than 1400 packing houses in Palestine in all states of repair.² Since that time packing operations have become increasingly centralized and by 1955, more than 50% (5.5 million-boxes) of Israeli citrus was packed in (seventeen) centralized houses with centralizing occurring at an accelerated pace as the remainder of the older houses

¹See "Citrus Marketing Scheme" and Rules as to Control of Export for 1953/4 Season." Economic News, April 1954 pp. 117-129.

²I.D. Ophen, op. cit., pp. 47-8

depreciate beyond repair.¹

Mechanization remains a controversial issue in Israel and Cyprus primarily because an efficient sizer has not yet been developed for the oval-shaped Shamuti. Some packers are opposed to mechanizing until complete mechanization (including sizers) can be accomplished in so far as the costs of handling, they argue, rise when partial machine handling and partial manual handling occur side by side. However, by 1955, there were in existence in Israel 14 mechanized centralized packing houses with a capacity of 4 million boxes.

Increased use of cardboard boxes seems to be occurring in Israel for packing citrus. During 1955, about 1 million boxes of citrus were packed in cardboard boxes and it is expected that about 30% of exported citrus will be packed in citrus during the next few seasons.²

The packing system in Lebanon isn't nearly so well-developed as in Israel. Most packing houses are small, with simple handling operations manually performed on the floors of the packing houses. The fruit is brought

¹State of Israel, Government Year Book 5717 (1956) p.76.

²ibid

from the orchards and piled on the floor where it stays for a day or so before it is packed. The fruit is not washed; much of it is infected with scales which are brushed off by hand. Sight grading is usually performed by women. Men wrap and pack the fruit. Not all the wraps, however, are treated with diphenyl,¹ as in Israel where it is compulsory.

Cyprus is more market conscious than Lebanon and tends to emulate developments in Israel. J. H. Burke observed a combination of modern handling and hand sizing in relatively large scale packing houses. One ton containers hold the fruit of the orchard; four such containers are loaded onto motor trucks and trailers. This loading and unloading in modern enterprises is usually aided by power lifts. Grading and wrapping are done by hand, and all wraps are diphenyl treated and as in Israel the packed fruit is then treated for further decay by gas fumigation before shipping.²

¹J.H. Burke, op., cit., pp. 16-19

²J.H. Burke, op., cit., pp. 9-10

PORT AND SHIPPING OPERATIONS

Citrus harvesting and shipping occur, in the main, in the exporting states of the Middle East, Israel, Lebanon and Cyprus, in the winter months. When the weather is particularly severe, open roadstead ports, Tel-Aviv-Jaffa, Tyre and Tripoli, because they don't permit protection for ships, cannot be used extensively for citrus exports. This factor complicates Israeli loading and shipping more than the other Middle Eastern States in that Tel-Aviv-Jaffa is in the midst of Israel's heaviest citrus concentration, while Lebanon's citrus is more evenly distributed along its coastline with the largest concentration near Beirut. The diversion of citrus traffic from Tel Aviv to Haifa Port, not only entails greater expense for haulage, but at points overloads transport and port facilities, causing pile-ups and expensive storage and delays to the detriment of the industry in Israel.¹ Although port facilities are being extended and productivity of Haifa Port is being increased, it should be expected because of the seasonal nature of citrus exports, that the facilities in Israel will continue to be subject to heavy pressure during the export season.

¹ A.S. Arnon, "Shipment and Marketing of Israel's Citrus Fruits," Economic News, April 1954, pp. 67-8

OVERSEAS SALES

Immediately following World War II, most fruit imports into European countries were accomplished through single buying agencies set up by the various governments. Since 1949/50, however, normal trade channels have been re-established in most of the markets with the exception of some countries where quotas are periodically fixed in bilateral trade agreements.¹

Shipment of fruit abroad is usually made on consignment or against definite orders. When shipments are made on order, an agreement may be made whereby a single price will be paid for all citrus imports during the season, and payment is made by letter of credit; or an agreement may be made where a letter of credit is opened but the price for each separate shipment over the course of season is arrived at when the shipment reaches port. In lesser instances, no letter of credit is opened but the buyer pays by cable several days before loading the fruit, or 80% of payment is guaranteed by letter of credit and the remaining 20% is paid within 30 days after

¹E.L. Levie, "Planning for Citriculture in Israel," Journal of Farm Economics, Vol. 36, 1954, pp. 654-5. These include at times, Holland, Norway, Finland and the Soviet Bloc countries.

the arrival of the shipment. In fewer cases yet, brokers abroad take a shipment at a guaranteed minimum price which is stated in a letter of credit, if better prices are received at auction, the broker pays the difference.¹

The more important markets of the United Kingdom, Holland and Belgium, receive shipments on consignment. Consignments are divided among the brokers according to delivery order. The local offices of the citrus Marketing Board in the United Kingdom arrange with the brokers the time and the quantity of fruit to be offered at auction according to the market situation daily. The brokers usually advance about 75% of the expected market price upon receipt of the consignment and between 3 weeks and a month following the auction final settlement is effected.²

MARKETS

Total fresh citrus imports into Western Europe, including Austria, Belgium, Denmark, France, W. Germany, Ireland, Netherlands, Norway, Sweden, Switzerland and the United Kingdom, have increased about 50% above the pre-war average; that is, from over 47 million boxes annual average

¹M. Liwni, op., cit., p. 90

²ibid, p. 91

between 1934-8 to over 72 million boxes in 1955/6. The Israel supply share of this market has dropped from a pre-war average of about 17% to about 9% in 1955/6. Cyprus, on the other hand, has increased her share of the market from about one-half of one percent before the war to more than 1% in recent years.

Average per capita consumption of citrus in Western Europe is now about 1/3 box per year (compared with a full box per year in the U.S.) Whereas before World War II, average per capita consumption of citrus in Europe equalled about 1/5 box per year. However, the growth in total citrus consumption has not been even in all countries. While the major markets of France and W. Germany have more than doubled their average pre-war consumption. The United Kingdom which before the war consumed more than a third of total citrus imported into W. Europe dropped its share to one sixth of total citrus imported into W. Europe, and now consumes less than 2/3 the amount consumed during the pre-war period. Austrian consumption has doubled; Belgian consumption increased by 50%; Danish consumption has quadrupled, Ireland has dropped to 2/3 its pre-war level; Dutch consumption has increased by 50%; Norwegian consumption has doubled; Swedish consumption has increased about 150% and Swiss

consumption has more than doubled. The following table shows the imports of oranges and grapefruits into the specified W. European countries for the periods 1934-8, annual average, 1949-53, annual average and annually from 1953/4 to 1955/6.

CITRUS IMPORTS INTO WESTERN EUROPE
(1000 boxes)

Country	1934-38	1949-53	1953-54	1954-55	1955-56	
	G	G	G	G	G	
Austria	545	439	684	906	1240	
Belgium	2327	3263	171	185	3574	193
Denmark	239	713	20	15	918	29
France	7892	15,294	127	17,377	20,429	416
W.Germany	6002	8180	13,309	223	14,520	
Ireland	5342	428	456	13,702	469	
Netherlands	2268	2288	45	2969	3831	97
Norway	723	769	45	1703	1594	
Sweden	1170	2531	46	2867	2849	52
Switzerland	837	1718	1844	46	1934	
U.K.	17,111	1680	11,351	1301	13,401	1404
All Fresh Citrus Imp-ports into W. Europe	47,308	53,919	67,123	68,091	72,483	1362

Source: U.S.D.A. Information and Data Relating to World Production and Foreign Trade in Fresh Citrus and Deciduous Fruits, Wash. D.C. 1957, pp. 57-79

1 1937-38
2 1936-38

THE MARKETING SITUATION IN SPECIFIED COUNTRIESAustria

Israel has more than doubled its relative share of the Austrian orange market while increasing its absolute shipments five fold from the prewar period, 16,000 boxes (3%) to 70,000 boxes (6%) during 1956/7.¹ The largest share of this market (between 80-90%) is supplied by Italy which is only a short distance from Austria and freight charges are relatively low. Italy has been Austria's traditional source for citrus products; this is reinforced by general trade relations between these two states. "Italy is a major consumer of Austrian industrial products. Therefore, Austria has accepted large quantities of Italian fruit and vegetables for reasons of trade policy."² Furthermore, it seems as though Austrian consumers prefer the taste of the highly acid Italian oranges grown on volcanic soil, "while consumers in most other European countries prefer the sweeter type of oranges produced in Israel, Greece and Spain."³

Almost all of Austria's imports of lemons are also from Italy; however since the liberalization of all citrus

¹U.S.D.A. op. cit., p. 57

²U.S.D.A., F.C.F. 7-77, p.2

³ibid

fruit imports except oranges and tangerines (July 15, 1955), American lemons to a small extent have been entering the market. Although Austria is only a small importer of grapefruit, American grapefruits in tiny quantities have been imported into Austria since the citrus trade liberalization act of July 1955. The major supplier of grapefruit to Austria is Israel which has shipped between 5 and 6,000 boxes/yr. there in the last few years.¹ Israeli grapefruit sold at 4.94 schillings/kg C.I.F; Austrian border during the winter of 1955/6 while American grapefruit was able to sell at 6.20 schillings per kg.²

Processed citrus under the heading of "candied peels and other citrus fruit" is imported into Austria from both Israel and America, however, "there is no active demand for fruit juices in a country where beer consumption is as high as it is in Austria."³ Nevertheless, Austria's import of all fruit juices have risen from less than 100 metric tons annually during the pre-war period to about 500 metric tons during recent years, and it is expected that as health diet notions spread, there will be a

¹U.S.D.A., op. cit. p.63

²F.C.F. 7-55, p. 5

³ibid

sizeable increase in demand for citrus fruit as well as other fruit drinks.

Belgium

Israel's share of the Belgian citrus market remains about 6% at present compared to 6% pre-war average from 1934-8. The average annual import from Israel was 153,000 boxes of oranges as compared to 191,000 boxes during the 1956/7 season.¹ Spain is the traditional major supplier of oranges to Belgium, but since the war the U.S. has taken an increasing share of this market and in 1956/7 supplied more oranges to Belgium than did Spain. Brazil and Italy have lost their pre-war importance in the market, although Italy continued supplying Belgium with important quantities of oranges (about 200,000 boxes annual average) up to 1953. During the pre-war period Palestine supplied about 152,000 boxes of grapefruit (80% of total supply) to Belgium. Although consumption of grapefruit remains at its pre-war period level, the U.S. and Israel in the post war period tend to fairly evenly divide the Belgium grapefruit market. In 1955/6, Israel supplied 96,000 boxes and the U.S. 86,000 boxes. In 1956/7 Israel supplied 81,000 boxes and the U.S. 104,000 boxes.² Israel's

¹U.S.D.A. op. cit. p. 57

²U.S.D.A. op. cit. p. 66

supplies of lemons to Belgium are very tiny, ranging between 4 to 11,000 boxes in the last few seasons out of a total market of almost 300,000 boxes.¹ The U.S. has become the predominant supplier of lemons to Belgium during the last few years, and the Italian supply (the traditional source of lemons to Belgium) has been considerably diminished on the Belgian market.

Prices in Belgium are very sensitive to supply conditions. Immediately following the announcement of the freeze in Spain in January of 1954, "orange prices on the Antwerp market rose about 50 cents a box,"² that is a somewhat less than 10% increase of the previously prevailing prices. During that season, as in other seasons, "the prices for larger sizes (of oranges) were no higher than those for size 288"³ This means that the larger size Shamutis from Israel and Valencias from America generally are at a disadvantage on the market. Since on the retail market, the consumer will not pay much more for the large orange than he would for the small orange, and since boxes packed with larger oranges contain less

¹ *ibid* pp. 69 and 74

² J. Henry Burke, Observations in the Citrus Market in Antwerp Belgium March 1954, U.S.D.A. F.A.S.; Wash.D.C. p.12

³ *ibid*

fruit than boxes packed with smaller oranges, the price per box on the auction market is usually lower for boxes of larger fruit. Peak production of the Israeli Shamuti is at very large sizes (176 oranges to the box rather than 288).

There doesn't seem to be a lively demand for processed citrus on the Belgian market. It seems that there is a general "Belgian dislike of any canned fruit."¹

Denmark

In the pre-war period, Israel exports of oranges to Denmark were so insignificant as not to be listed in Danish statistical abstracts. By 1954/5 and 1955/6, Israel supplied 374,000 boxes and 328,000 boxes² respectively, considerably more than one third of total Danish consumption of oranges. Israel has become the second most important supplier of oranges to Denmark after Spain. The bilateral trade agreements between Denmark and Israel, may help to explain partially the very large rise of Israeli orange exports to Denmark. Some emphasis must, however, be placed on the general rise in Danish consumption owing to greatly increased prosperity since the

¹J. Henry Burke, Some Observations on the Belgium Citrus Market, U.S.D.A. F.A.S., Wash. D.C. August 14, 1953/p.3

²U.S.D.A. op. cit. p. 58

pre-war period. Denmark's present orange imports from Israel alone are 150% her average pre-war orange imports from all sources.

Danish importers attribute the increased consumption and imports of fruit in general to three factors:

1. Improved economic circumstances for the rural people who consequently change their diets to consume more fruit.

2. A new attitude towards saving; since the devaluation, of Danish currency, along with other European post war devaluations the people have less confidence in currency and tend to save less.

3. A change in price relationships seems to have made fruits less expensive than other goods. In 1953/4 one orange cost no more than 2 cigarettes.¹

Denmark's consumption of grapefruit has also increased spectacularly from her pre-war average of 9000 boxes annually to 29,000 in 1955/6.² Israel has in recent years supplied more than 2/3 of Danish grapefruit.

¹ J.H. Burke, Citrus Markets and Marketing in Western Europe, 1953, U.S.D.A., F.A.S., Wash. D.C. 1954, p.34

² U.S.D.A., op. cit. p.66

consumption, 15,000 boxes in 1954/5 and 20,000 in 1955/6.¹ Denmark's consumption of lemons has almost doubled from her pre-war average 71,000 boxes to 134,000 in 1955/6.² Israel supplied about 10% of Denmark's consumption of lemons during the 1955/6 season.³

Processed citrus is not well known nor popular in Denmark; the only products seen in Denmark during 1953/4 were Israeli single strength orange and grapefruit juices.⁴

France

France has become the largest consumer of citrus fruits in Europe and the world's largest importer of citrus rising from an average annual import of less than 8 million boxes of oranges before the war to over 20 million boxes in 1955/6. Prior to the war Spain supplied about 70% of France's orange imports, the U.S., Lebanon, Brazil and Italy supplied about 2.5% each. Israel supplied slightly more than 1%. Algeria, Morocco and Tunisia together supplied about 15% of France's orange imports.

¹ ibid

² ibid, p. 74

³ ibid p. 69

⁴ F.A.R. #79, p. 36

Since the war, with the greatly expanded citrus groves in North Africa, Algeria, Morocco and to a much lesser extent Tunisia have improved their supply share to over 60% in 1955/6, over 12 million boxes. Although Spain supplied almost 7 million boxes in 1955/6, its share dropped to about 30% of the French market for oranges. The U.S. has about doubled its exports of oranges to France but its share of the market dropped to 2%; Lebanon's exports have fallen to a fraction of its pre-war exports (nearly 200,000 boxes) to 29,000 boxes in 1954/5 and almost none in 1955/6; Israel has more than doubled its pre-war export and continues to supply about 1% of the French market for oranges.¹

During the winter of 1954/5, the Secretariat of Foreign Affairs in France revised its regulations governing the importation of citrus fruits into France. The revised regulations sought to stop bulk shipments of citrus.² The effect of these regulations will be felt mainly by Spain which has in the past exported its citrus almost solely in bulk to France. The packing of Spanish Oranges will increase their price and hence may make the oranges of other countries more competitive.

¹U.S.D.A. op. cit., p. 58

²U.S.D.A. Foreign Crops and Markets, Wash. D.C. Nov. 22, 1954, p. 555

Although France's prosperity has risen since the pre-war period, its holdings of dollars, other foreign currency and gold is considerably below the pre-war level. Hence, its imports from dollar areas are quite restricted. Most favored are the North African States which share the French currency; this explains the large growth in North African citriculture and exports to France.

France has entered into bilateral trade agreements, from year to year, with Spain and Israel.¹ In 1953, France agreed to import, during the following season, 4000 metric tons (about 110,000 boxes) of Israeli grapefruit.² Prior to this agreement (1953) French import of Israeli grapefruit was about 28% of the pre-war level, when Israel supplied 86,000 boxes of a total of 107,000 boxes of grapefruit. By 1955/6 French consumption of grapefruit rose to 416,000 boxes, of which Israel supplied 144,000; Morocco supplied 104,000; and Algeria supplied 93,000 boxes.³

France's market for lemons continues to be supplied largely by Italy and Spain, but the share of the market

¹F.A.R. #79, p. 38

²ibid

³U.S.D.A., op, cit. p. 67

supplied by Algeria, Tunisia and Morocco is increasing yearly, as new trees come into bearing. By 1955/6 the N. African countries accounted for 25% of the French lemon market as against little more than 2% before the War. The Lebanese share fell from about a 5% pre-war average to 1% in 1954/5. In the following seasons Lebanese exports to France dwindled to negligible quantities.¹

The French market for citrus juices is not yet strong but will probably grow with increased barter trading.² It is through this means that Israeli juices might penetrate the French market where inferior North African juices have held a predominant position.

West Germany

West Germany has become the world's second largest citrus importer. It's consumption of oranges has grown from a pre-war annual average of 6 million boxes in all Germany to about 14.5 million boxes in 1955/6 in W. Germany.³

In 1938 all Germany imported over 182,000 boxes of oranges from Egypt, 82,000 boxes from Palestine, 59,000

¹ ibid. p. 75

² F.A.R. #79, pp. 38-9

³ U.S.D.A., op. cit., p. 59

boxes from Turkey, 8,000 boxes from Lebanon, while Spain, Italy and to a lesser extent Brazil supplied most of the orange imports into Germany.¹ Since the war, and especially 1956/7, while Spain and Italy continued to be the major suppliers of oranges, Brazil, Egypt and Greece had been displaced by the important growth in other sources of supply: the U.S. supplied 1,144,000 boxes of oranges; Israel, 798,000 boxes; Morocco, 285,000; South Africa, 718,000. Although in 1956/7 Cyprus supplied only 17,000 boxes of oranges, in the preceding two seasons, she supplied 125,000 and 86,000 boxes, respectively; Algeria sporadically supplies large numbers of oranges to Germany.²

Germany's imports of grapefruit have grown in recent years, to include in 1956/7, 167,000 cases from Israel,³ and 79,000 cases from the U.S.⁴

Germany's lemon market is largely supplied by Italy. Some years Turkey has sent significant quantities of

¹J.H. Burke, Some Observations on Western Germany as a Citrus Market in 1952, U.S.D.A., FCF 3-53, Wash.D.C. 1953, p.2

²U.S.D.A., op., cit., p. 59

³ibid, p. 63

⁴ibid, p. 65

lemons to Germany, averaging about 20,000 boxes annually between 1949-53. In the last few seasons, Turkey's lemons exports have been negligible.¹

The large rise in German consumption of citrus can be attributed to the rapid rise of its industrial production index and to its favorable trade with other nations and hence its increasingly large gold and dollar holdings. The prosperity of W. Germany has induced a large change in the diet of the people so that fruit and vegetables are consumed more readily in the urban industrial areas. Citrus juices are well established in W. Germany, "and retailers report that sales are increasing", although canned segments are not well known and only in small demand.²

Ireland

Ireland, like England, fell off in its orange demand from an average annual pre-war import of 534,000 boxes to 344,000 in 1956/7. The market is fairly evenly divided among Spanish, Israeli and South African citrus supplies.³

¹ ibid, p. 75

² F.A.R. #79, p.44

³ U.S.D.A., op. cit., p. 59

Netherlands

The supply picture of the Netherland's market for oranges has changed somewhat since the pre-war period, when Spain supplied somewhat less than 50%, Israel averaged around 25%, Brazil averaged about 13% of the total sources of import. By 1955/6, although Spain still remained the most important single supplier, the U.S. supplied more than 25% of the market. Israel dropped its share to about 15% of the market, Brazil's position became negligible and S. Africa's position rose from a negligible pre-war supply to about 6% of the total Market.¹

Israel's position declined somewhat in the grapefruit market of the Netherlands where it commanded about 80% of the pre-war market, to the last few years when its supply share has varied around 50%. The U.S. again here accounts for the greater part of the remainder of the market, although since the War, Surinam has supplied an important part of the market, ranging from 30% in the period between 1949/53 to 10% during 1956/7.²

¹ ibid, p. 60

² ibid, p. 67

The U.S. has become Netherland's most important supplier of lemons in recent years, displacing the Italian product to some extent.¹ Israeli lemon supplies to the Netherlands have also grown from a pre-war average of 4000 boxes to 16,000 boxes in 1955/6,² about 10% of the lemon market.

The Netherlands economic improvement since the early post war years accounts for its rise in citrus consumption. An indication of the economic vitality of the country showed in its ability to quickly recover from the effects of the devastating flood which occurred in the winter of 1952/3. It was in the following seasons that the most rapid growth of citrus consumption took place in the country.

"Like most Europeans the Dutch prefer fresh fruit" to processed citrus, hence, canned products are relatively slow. Most citrus products take the form of canned juices, 85% of which is consumed in the summer. American, Israeli and West Indian products are competitive for this market.

¹ ibid, p. 76

² ibid, p. 69

Norway

While the Norwegian market for oranges has doubled from its pre-war average, Israeli supplies have somewhat more than doubled, averaging 166,000 cases during the pre-war period (23% of the total market) to 407,000 cases in the 1955/6 season (25% of the total market). The U.S. and Italian sources of supply have diminished to relatively negligible shares while Spain's share has increased from about 45% of the pre-war market to about 60% in recent years.¹

Norwegian consumption of grapefruit remains quite small. Israel supplied 18,000 boxes on the average during the pre-war period and between 21 and 23,000 during the last two years.² American supplies have increased from 6,000 boxes of grapefruits to Norway, on the average in the pre-war period to an average of 10,000 boxes during the last two years.³ This represents virtually all the grapefruit consumption of Norway.

The increased consumption of citrus fruit in Norway can't easily be related to the industrial production

¹ U.S.D.A. op, cit., p. 60

² ibid, p. 63

³ ibid, p. 65

index nor to its gold and dollar holdings. Since these didn't rise in any degree like citrus consumption did. The improved economic position of the farmers and fishermen has been suggested along with changed food preferences as the causes of increased demand for citrus.¹

Norway's consumption of processed citrus appears to be fairly restricted to bottled citrus-flavored soft drinks and to marmalades.²

Norway continues to contract citrus from Israel through bilateral trade agreements. Because hard currency is not easily obtainable, American imports are rigidly curtailed.

Sweden

Sweden's orange market has grown considerably since the pre-war period, but the shares held by the various suppliers on the whole haven't changed radically. Thus while the total market is about 2.5 times the size of its pre-war average, Spain continues to supply about 40% of the total, Italy about 30%, Israel somewhat more than 20%, and the U.S. about 10%. While Brazil's share has

¹ F.A.R. #79, pp. 52-3

² *ibid*, p. 54

decreased from about 4% to a negligible portion and Cyprus from 1% to less than one third of one per cent, South Africa's share has increased from about 5% to more than 12% in recent years.¹

The grapefruit market in Sweden has increased about 50% more than its pre-war average in recent years, but Israel's share has dropped from 26,000 boxes (70% of the market) to about 20,000 boxes in recent years (35% of the market), while the American share rose from an average of 4000 (10%) boxes during the pre-war years to more than 30,000 boxes (60%) during recent years.²

Sweden's lemon market is supplied primarily by Italy as in the past. Since 1954/5, the U.S. has been supplying between 8-30% of Sweden's market for lemons to make up for the declining Spanish share.³

Israeli processed citrus is competitive with American and West Indian products on the citrus market as to quality and price, but it has been suggested that some buyer resistance to Israeli grapefruit sections exists

¹U.S.D.A. op., cit., p. 61

²ibid, p. 68

³ibid, p. 76

owing to "unattractive labeling".¹

Switzerland

It has been observed that because of the desirability of Swiss currency, the Swiss market is always well supplied with oranges, even though there may be a shortage of citrus supplies elsewhere during any given season.² The Swiss market for oranges has grown to more than twice its pre-war size. The Israeli and U.S. shares of this market grew from a pre-war average of 21,000-22,000 boxes (2.5% of the total each) to 121,000 and 125,000 boxes, respectively during the 1956/7 season (about 7.5% of the total each). Italy the traditional source continues to supply about 2/3 of the Swiss market. Spain tends to supply on the average as in the pre-war period approximately 1/4 to 1/3 of the market.³

Switzerland's grapefruit market has grown threefold from the pre-war period, and while Israel continues to supply the greatest part of that market, U.S. exports have grown to between 1/3 and 1/2 the size of Israeli exports to Switzerland.⁴

¹F.A.R. #79, pp. 58-9

²J.H. Burke, Observations on the Swiss Citrus Market October 1955, U.S.D.A., Wash, D.C. November 1955, p.1

³U.S.D.A. op. cit., p. 61

⁴ibid, pp. 63 and 65

The Swiss lemon market has grown almost two fold since the pre-war period; the Israeli share has increased from about 12% during the earlier period to about 15% during recent years; the U.S. share has increased from a negligible quantity to about 20% of the total market.

Quantities from Italy have remained fairly constant varying between 250-300,000 boxes, but its share has dropped from 80% in the pre-war period to about 50% during the past few years. Spanish supplies have fluctuated explosively in the post war period.¹

Processed citrus, largely juices, sell mainly in the summer in Switzerland. In 1955, Spanish frozen concentrates began to appear increasingly on the Swiss market.²

The United Kingdom

Although the English market is considerably diminished from its pre-war size, it remains not only an important world market, but also the most important market for Middle Eastern produce. The imports of oranges for the five pre-war seasons into the U.K. averaged somewhat more than 17 million boxes annually of which Israel supplied about 1/3 of the total. Cyprus's share of the

¹ *ibid*, p. 77

² Burke, *op.*, *cit.*, *supra*; pp. 2 and 4

market was only about 1% but this accounted for more than a third of Cyprus's total orange crop. During the last few seasons Cyprus has been shipping over a half million boxes of oranges annually to Britain ranging from 1/2 to 2/3 of Cyprus's total crop and accounting for between 4 and 6% of the market. Israel's total exports to Britain have fallen to about half their pre-war size and Israel's share of the British market for oranges has dropped from a pre-war average of a third to between 1/4 and 1/3 of the total market during recent years. The importance of other orange suppliers has shifted radically from the pre-war period. Thus, Brazilian and U.S. shares have declined to a small fraction of their pre-war importance. Spain has again become the most important supplier of oranges, and South African oranges at present are as important a supply as Israel's, whereas S. Africa supplied only about 14% of the pre-war market.¹

The British market for grapefruit has also declined since the pre-war period from an average of about 1.7 million boxes to about 1.4 million boxes since 1953.² Cyprus's production of grapefruit averaged less than

¹U.S.D.A. op. cit. pp. 48, 51, and 62

²ibid, p. 68

50,000 boxes during the pre-war years and hence shipped negligible quantities to England; its production since the war has increased to between 200 and 300,000 boxes,¹ of which it ships half to Britain, accounting for about 10% of the total market.² The Israeli supply and share of the market remains about the same as the pre-war average ranging between 40 and 50% of the total. The U.S. supply of grapefruit to Britain averaged almost 300,000 boxes during the pre-war period, but has been negligible for most of the post war years, except the last three seasons, when between 47,000 and 218,000 of U.S. grapefruit has been supplied. South Africa continues as in the past to supply between 15% and 20% of the market, and the British West Indies continue to supply between 10% and 15%.³

The United Kingdom consumes less than half the quantity of lemons that it did in the pre-war years when it averaged about 1.8 boxes of lemons annually. Italy continues to be the main supplier but its share dropped from 2/3 during the pre-war period to somewhat more than half during the post war season. While Israel shipped

¹ ibid, p. 49

² ibid, p. 68

³ ibid

on the average 30,000 boxes annually during the pre-war period it has shipped between 48,000 and 90,000 boxes during the last three seasons. Similarly, South Africa's share has grown during the post war period from about 33,000 before to between 45,000 to 63,000 since the war. U.S. shipments of lemons have been sporadic since the war, whereas, its supplied almost 10% of the pre-war English market. Spain's share also dropped dramatically from over 350,000 boxes annual average during the pre-war period to about 200,000 boxes annual average up to 1953; since the frosts in 1953 and 1955 the Spanish share has dropped to less than 60,000 boxes annually. While Lebanon supplied more than 70,000 boxes annually during the pre-war period, its shipments have been negligible since the war. Cyprus, on the other hand, which shipped only about 30,000 boxes annually before the war (about 30% of her total produce) ships between 70,000 and 95,000 boxes annually since 1953 (between 35% and 45% of her total produce.)¹

The English market for processed citrus is the largest in Europe. To a great extent, the demand for citrus products has been stimulated by the child-health

¹U.S.D.A. op, cit; p. 77

program of the British Ministry of Food.¹ The largest part of processed citrus however, is brought in through regular channels by the organized fruit trade of England. The U.K., is supplied with most of its single strength juices by South Africa, Israel and the West Indies. Grapefruit juice from the West Indies and orange juice from Israel seem to be preferred by the consumers. Grapefruit sections from Israel, the West Indies and South Africa, do not seem to be of sufficient quantity to meet the demand as supplies in the hands of retailers quickly become depleted. American marketing specialists suggest that the American product could rapidly fill in the deficiency of supply, but that restrictions on dollar trade preclude any sizeable reintroduction to the market.² Whereas, fresh citrus prices tend to be 25% below average citrus prices on the continent, processed citrus bring much higher prices in Britain than on the continent.³ This price discrepancy can be attributed to the fact that the British consumer has come to prize fruit juices while most continental Europeans continue to dislike all canned fruit and juices.

¹cf. section of this study devoted to the Israel Products Industry

²F.A.R. #79, pp. 69-71

³ibid

The decline in the English market for citrus fruits was a disappointment to Mediterranean orchardists and although other European markets have more than offset the English decline by their own growth, the fact that major markets can decline over long periods as seen in the U.K., tends to temper the optimism of some citriculturists and serves sharp warning as to the essential nature of citrus on the market. That is to say, although citrus seems increasingly to be regarded as a necessity rather than a luxury in the minds of European consumers, when "The chips are down" and retail prices rise much faster than wages, as has been occurring in Britain particularly since the devaluation, the wage earner must more rigidly allocate his income to more basic consumption items such as cereals, shelter and warmth rather than fruits no matter how highly he has learned to prize them. Furthermore, the index of import prices since the devaluation have been rising even faster than that for general retail prices, inducing a lower consumption of imported goods including citrus, and substituting more domestic produced items in the consumption

budget, such as apples.¹

Eastern Europe and the Soviet Bloc

The Soviet bloc countries with the exception of the U.S. S.R. have all sharply curtailed their citrus consumption since the pre-war period, while Russia itself has largely increased its citrus consumption. Independent Eastern European countries such as Finland and Yugoslavia have considerably increased their consumption since the pre-war period. Much of the increase in consumption has occurred through the medium of bilateral trade agreements, such as those between Yugoslavia and Israel and Finland and Israel. Most Soviet bloc trade also occurs through bilateral arrangements.

Bilateral trading arrangements give deficit trade balance nations like Israel an advantage over nations with a more balanced trade (or a favorable trade balance), hence Israel has become the major supplier of citrus to

¹ Britain is now producing more than twice the quantity of apples produced during the pre-war period, and while the quality observed by American fruit experts hasn't been very "good", the prices for the apple on the retail market have averaged twice the price for the orange. CF. J.H. Burke, F.C.F.-9-50, F.A.R. #63, F.C.F. 7-52, F.A.R. #79, and F.C.F. 3-54, U.S.D.A. Wash., D.C. The relationship in price and quantity between citrus and other fruits will be examined further in a discussion on competing goods.

all Eastern European countries, Spain and Italy continue to supply some of the Eastern European countries with fluctuating quantities of citrus. Lebanon has arisen in recent years as a source of supply of oranges and lemons to the Soviet bloc countries.

Soviet Bloc Countries

Bulgarian consumption of oranges continues to be almost totally supplied by Israel. Israel averaged an export of about 33,000 boxes annually between 1935-9. Between 1949-53, Israel supplied an average of only 4000 boxes annually. During the last three seasons, 1954-6, Israel shipped 18,000, 42,000 and 19,000 boxes of oranges respectively.¹ Bulgarian consumption of lemons, also supplied almost totally by Israel, has fluctuated largely from year to year: 1000 boxes in 1949, 50 and 53; 13,000 boxes in 1954 and 15,000 boxes in 1955.²

Czechoslovakia continues to be supplied by her traditional source, Italy. Her import of lemons from this source, however, are down from a pre-war annual average of over 400,000 boxes to between 118 and 164,000 annually for 1953 to 1956.³ Czechoslovakian imports of oranges from

¹U.S.D.A., op. cit., p. 51

²ibid, p. 69

³ibid, p. 70

Italy are down from a pre-war average of over 200,000 boxes annually to an annual average of 90,000 boxes between 1949 and 1953. Since 1953 Italy has supplied no oranges to this market,¹ while Lebanon has been invited to attempt to fill the breach.

Hungary was supplied in the pre-war period with both oranges and lemons mainly by Italy. Her consumption of oranges before the war averaged annually about 400,000 boxes from Italy and 12,000 boxes from Israel. Since the war she has received virtually no oranges from Italy and varying quantities from Israel ranging up to 11,000 boxes.² Hungary's lemon imports declined from an annual average of 156,000 boxes during the pre-war period to less than half that amount between 1949 and 1953. Since 1953, Italy has shipped no lemons to Hungary and Israel's shipments have varied between 5000 and 13,000 boxes.³

Poland's consumption of oranges supplied by Israel has dropped from a pre-war annual average of nearly 300,000 boxes to about 1/3 that amount since the war,⁴ while

¹ *ibid*, p. 52

² *ibid*, pp. 51-2

³ *ibid*, pp. 69-70

⁴ *ibid*, p. 51

her consumption of oranges from Italy averaging annually 400,000 boxes before the war has dropped to almost zero since the war. Polish consumption of Israeli grapefruit has also dropped from a pre-war annual average of 22,000 boxes to about 10% of that quantity since the war, although her consumption in 1955 and 1956 increased again to 10,000 and 12,000 boxes respectively. The lemon market in Poland was largely supplied by Italy before the war to the extent of an annual average of nearly 350,000 boxes. Since the war, Polish consumption dropped to tiny quantities, being supplied with an annual average of 30,000 boxes between 1949 and 1953 by Italy and an average of 18,000 boxes in 1954 and 1955 by Israel. In 1956 consumption reached half the pre-war size, being supplied with over 170,000 boxes by Italy.¹

Rumanian consumption of all citrus continues to be almost totally supplied by Israel. Her consumption of Israeli oranges dropped from a pre-war annual average of 166,000 boxes to less than 20,000 boxes on the average annually since the war. Grapefruit dropped from a pre-war annual average of 26,000 boxes to less than 10% of that quantity annually since the war. Lemons dropped from a pre-war annual average to about

¹ *ibid*, pp. 69-70

2/3 of that quantity since the war.¹

The U.S.S.R. on the other hand, has increased her consumption of citrus since the pre-war period when she imported on the average 14,000 boxes of oranges from Israel and 1,000 boxes from Italy. Since the war, Russian orange imports from Israel have averaged about 1/2 million boxes annually (except 1956 when she refused to accept previously agreed quantities from Israel for political reasons); and from Italy, Russia has averaged annually an additional 200,000 boxes of oranges.²

Russia doesn't import any grapefruit. Russian lemon consumption has also increased substantially. Italy's exports during the pre-war period averaged annually 32,000 boxes. Since the war, Italy has been shipping more than 10 times that amount, and averaging annually over a half million boxes since 1953. Israel in 1954 shipped 23,000 boxes of lemons to Russia and 41,000 boxes in 1955; (there were no shipments again in 1956, because of the political differences alluded to above)³.

There has so far been no market at all for processed

¹ ibid, p. 69

² ibid, pp. 51-2

³ ibid, pp. 69-70

citrus in the Soviet bloc countries. This may be because 1) these countries share a preference with the rest of Europe for fresh fruits, 2) they have a more plentiful supply of summer soft fruits (since processed citrus is used mainly in the summer when there is little Mediterranean fresh citrus), and 3) the greater expense of processed citrus precludes their consumption in the less prosperous (or less concerned with consumer goods) countries of this bloc.

Finland

Finland's increase in citrus consumption has been very marked. Her imports of oranges which annually averaged 76,000 boxes during the pre-war period from Israel have increased to between 500,000 and 650,000 boxes annually during the last three seasons. Her imports from Spain have also increased from an annual average of 50,000 boxes of oranges during the pre-war period to an average of 200,000 boxes annually since the war. Her orange imports from Italy were very small (14,000 boxes on the average) in the pre-war period and have become non-existent since 1953.¹

¹ Ibid, pp. 51-3

The grapefruit market in Finland, supplied totally by Israel, has increased from a pre-war annual average of 4,000 boxes to 15,000 boxes up to 1953 to between 20,000 and 27,000 boxes during the last three seasons.¹

Finland's lemon market is quite small and supplied mainly by Spain, although Italy was her traditional source of supply in the pre-war and early post war periods.²

Yugoslavia

Yugoslavia was supplied by Italy (2/3 of the market) and Israel (1/3 of the market) with oranges in the pre-war period when she averaged an annual import from these two countries of somewhat less than 90,000 boxes.

Since 1954, Israel has supplied over 100,000 boxes of oranges annually to Yugoslavia, while Italy in occasional years supplies several thousands of boxes of oranges.³

Yugoslavia imports no grapefruit and not much of lemons, but got most of her supply of the latter from Israel since 1954 when she purchased 22,000 boxes. In 1955 and 1956 Yugoslavia imports of Israeli lemons were 10,000 and 25,000 boxes annually.⁴

¹ *ibid*, p. 63

² *ibid*, pp. 70-1

³ *ibid*, pp. 51-2

⁴ *ibid*, p. 69

Western Hemisphere

From time to time, Israel has attempted to penetrate markets in the Western hemisphere. Chief in Israel's desires to develop a market is Canada which consumes more than 6.5 million boxes of all citrus annually since the war. Almost all of Canada's imports came from the U.S., and although Israel has transport disadvantages to the Canadian market, the hardness of the Canadian dollar continues to lure her on. In any case Israel hasn't succeeded selling more than 50,000 boxes of citrus fruits to Canada in any year, including the pre-war period, and in most years has sold considerably less than 50,000 boxes. In occasional years Israel makes a bilateral agreement with Argentina and ships some tens of thousands of boxes of citrus there.

Quantities of citrons are shipped to America each year before the Feast of Booths and some tens of thousands dollars worth of citrus essences are sold here. By and large, however, Israeli attempts to penetrate the American sphere have been unsuccessful.

CHAPTER VII

TRENDS IN SUPPLY AND DEMAND CONDITIONS OF CITRUSSUPPLY

Since it takes from five to seven years after planting for the average citrus tree to bear fruit, expansion of citrus supply is limited to relatively long periods. As in all other areas of investment, the entrepreneur's anticipations of the marginal efficiency of capital in any given investment are related to his expectations concerning shifts in the demand curve of the industry and to shifts in the supply curves of the other firms of that industry.

The gap between the new investment in citrus and the increased revenues forthcoming from this new investment makes for greater risk-taking than in most other industries where increased output occurs in one to two years following the order for new equipment. The risk to citrus entrepreneur's is heightened further by the fact that his basic capital equipment-trees-cannot be put to alternate economic uses, and tend to depreciate at a relatively slow pace since the commercial life of the citrus tree averages about 30 years.

The anticipation of profits must be so great as to overcome the natural reluctance (liquidity preference) of

the entrepreneur's in citrus to wait so long for returns on his investment. As was demonstrated in the chapter on citriculture in Israel large profits have been forthcoming to the orchardist. They have been similarly large in most citrus regions. Hence, it is no surprise to note that new plantings and output have increased rapidly following the end of World War II. Thus, present world production of citrus is more than 2/3 larger than it had been on the average during the pre-war period 1935-1939. Mediterranean production, including Greece, Italy, Cyprus, Iran, Lebanon, Palestine-Israel, Syria, Turkey, Algeria, Egypt, Morocco and Tunisia, is more than 50% larger than it had been during the pre-war period in spite of the declines in production in both Palestine-Israel and Spain.¹

¹Owing to a series of frosts, Spanish production fell from almost 46 million boxes of citrus in 1953 to less than 18 million boxes in 1956. Thus had Spanish citrus kept to its 1953 level, Mediterranean production of citrus would have reached almost 200% of its pre-war average rather than 155%. A December 1, 1957 dispatch to the New York Times notes that the Spanish industry has recovered from the frosts of the past few seasons and will perhaps achieve a harvest of 50 million boxes during the 1957/58 season.

**World and Mediterranean Production of Citrus Fruits,¹
Annual Averages 1935-39 and 1949-53, Annually 1953 to 1956
(Million Boxes)**

<u>Season</u>	<u>World Production</u>	<u>Mediterranean Production</u>
1935-39	263.0	73.9
1949-53	386.4	107.1
1953	429.8	129.5
1954	430.8	121.9
1955	429.0	116.9
1956 ²	436.8	114.6

Source: U.S.D.A. Information and Data Relating to World Production and Foreign Trade in Fresh Citrus and Deciduous Fruits, Wash. D.C. October 1957, pp. 46-9

Italian production of oranges and tangerines has almost doubled from its pre-war average of 11.7 million boxes, Spain in 1957/8 will probably double its pre-war average of 24.2 million boxes (cf. note page 156); Algeria has quadrupled its pre-war average 3.2 million boxes; and Morocco's increase has been most spectacular in that its output has grown about eleven fold from a pre-war average of 900,000 boxes to 10 million boxes in 1956, making it one of the regions major producers.³ All of these

¹Includes oranges, tangerines, grapefruit and lemon production in the principle citrus producing nations in the world.

²Preliminary estimates for 1956

³U.S.D.A. op. cit., p. 46

Mediterranean producers (the major competitors for the European Market) plus the Middle Eastern producers (analyzed earlier) have announced that they are further increasing the rate of new plantings over the next decade.

Non Mediterranean Competitors

S. African production of oranges has grown to twice its pre-war average of 4.2 million annually, and is scheduled to continue increasing as more trees planted in the 1950's come into fruit bearing. The influence of S. African fruit on the market is somewhat mitigated since it is harvested in summer and early autumn in contrast to most Mediterranean citrus which are harvested in "mid season" (mainly winter and early spring). U.S. and Brazilian citrus are also mainly shipped to Europe during late Spring and Summer.

While Brazilian competition on the European markets hasn't been particularly intense during the post war period, the sharp rise in Brazilian production from 1958 on (because of the maturing of large numbers of citrus plantings in early 1950's) will probably bring increased offerings of the Brazilian product in Europe. The Brazilian Pera orange, however, suffers several disadvantages;

- 1) It is thin-skinned and therefor doesn't hold up well in long distance shipping, and
- 2) It is a seedy orange (usually 8 seeds/fruit) and therefor fetches about 40% of the average price which most Mediterranean oranges bring (European consumers preferring non seedy fruit.)

U.S. production of oranges averaged about 132 million boxes annually between 1955-57, almost twice the pre-war average of about 67 million boxes.¹ However, balance of payments difficulties (dollar shortage) in most European countries have served to reduce U.S. exports of citrus to W. Europe to a fraction of its pre-war total. It can be expected that the American product will continue to be excluded from those countries which suffer unfavorable balances. J.H. Burke considers devaluation of W. European currencies as having had the greatest influence on the possibilities of the import of U.S. citrus since it has had the effect of greatly increasing the prices of U.S. products (and shipping) in terms of European currencies "and has thus made them less competitive with other citrus".² However, in those countries which

¹U.S.D.A., Crop Production 1957 Annual Summary, Wash, D.C. 1957, p. 98.

²Observations on the U.K. Citrus Market, Wash. D.C. Dec. 1950, p. 12

have favorable trade balances the import of U.S. oranges has increased markedly;

to Germany, from a pre-war average of 44,000 boxes to 560,000 in 1955;

to the Netherlands, from a pre-war average of 204,000 boxes

to 1,065,000 in 1955;

to Belgium, from a pre-war average of 130,000 boxes to 885,000 in 1955;

and to Switzerland, from a pre-war average of 2000 boxes

to 214,000 in 1955.¹

DEMAND

Considering the overall world increase in the production of citrus, and a large projected increase in citrus production over the next decade, plus the large increases in production of other fruits and their marketing in Europe, the question of European fruit consuming capacity arises. It is expected that severe marketing and price problems may occur in the European citrus and other fruit markets in the near future. In fact, there has already been a long term decrease in unit orange real value. Whereas the volume of international trade in oranges reached about 190% of its

¹U.S.D.A. (Data and Information) op. cit., p. 56

1920-38 average, the real value of total orange trade has only reached about 160% of its 1920-38 average.¹

Yet, as was noted in the chapter on Israel Production, there has been an intensive increase in planting of new citrus orchards in Israel since 1952 when 32,500 acres were planted with citrus. Since 1952, an additional 30,000 acres have been planted to citrus which will increase exportable citrus fruit from Israel to about 13 million to 14 million cases/year by 1962/63. During the 1957/8 season the first 10,000 to 150,000 cases to be harvested from new plantings are expected. The harvest is expected to increase by a half million cases next year, by a million cases per year after that.²

At present, a controversy is going on in Israel as to how far to increase new citrus plantings. Some argue, that the point of saturation has already been reached, while others insist that Israel should continue increasing until 75,000 acres is reached (equal to the highest pre-war citrus acreage in Palestine, when if

¹ In fact, with the recovery of the Spanish citrus industry in 1957/8 competition is already growing increasingly tense. Thus, Dr. Abba Arnon, General Manager of the Citrus Marketing Board of Israel, noted that advanced sales prices for Israeli citrus have already averaged two shillings/case less than last season's prices. cf. New York Times, 12/8/57.

² New York Times, December 8, 1957

fully bearing, exports were expected to reach about 23,000,000 boxes/year.) The major proponent for limiting citrus expansion in Israel is Dr. E.L. Levie, of the Planning Centre of the Israel Ministry of Agriculture and the proponent for extending citrus planting is J. Ophen, chief of the Citriculture Section of the Israeli Ministry of Agriculture.¹

The controversy centers about the citrus consumption capacity of the overseas markets. Ophen takes an optimistic view based on the increased per capita citrus consumption in the continental countries of Europe and the recent increased prices in all markets. Levie, on the other hand, comes up with a pessimistic view based on economically sophisticated methods of measurement of demand.

However, before proceeding with our inquiry into trends in demand, it is of utmost importance that the following caveat be noted. Most pure economic theorists hold with Lionel Robbins view that "as a consequence of the

¹E.L. Levie, "Planning for Citriculture in Israel," Journal of Farm Economics, Vol. 36, 1954

E.L. Levie, "Tahomei Pituah Hapardesanut," Rivon L'Kalkalah, October 1955 (Hebrew)

J. Ophen, "Memader N'itiat Hahadarim," Rivon L'Kalkalah, October 1955 (Hebrew)

E.L. Levie, "Orange Consumption and National Income" Israel Export Journal, May 1956

conception of value as an expression of an order of preference that comparisons of prices have no precise significance, unless exchange is possible between the commodities whose prices are being compared. It follows, therefore, that to compare the prices of a particular commodity at different periods of time in the past is an operation, which, by itself, does not necessarily afford results which have further meaning."¹

Thus, while relationships exist among income, price and quantity demanded of oranges, it doesn't necessarily follow that these same sets of correlations will appear from period to period. Nevertheless, Levie and other practitioners of applied economics seek to bring some light to the chaos of (price) history through the application of multiple regression equations over a period of time showing the correlation of price, income and quantities demanded, and from this predict, *ceteris paribus*, future demand. Of course, it should be noted, that the assumption of *ceteris paribus* is essentially static and cannot account for autonomous shifts in the demand curve based on change of tastes owing to widespread information of nutritional science, or change in product

¹ Lionel Robbins, An Essay on the Nature and Significance of Economic Science, MacMillan and Co., Ltd. London, 1952, p. 59

owing to improvements in processing or distribution, rather than simply the variables of change in income or price alone.

With these important reservations in mind, it is possible to resume the discussion on citrus demand with a clearer understanding of the tenuous nature of the statistical prognoses.

Levie in, one argument, runs a series of multiple regression equations showing the relationship between income, price and quantities of Shamuti oranges on the pre and post World War II markets of the United Kingdom and the aggregate of continental markets. Finding highly significant correlation coefficients to the linear curves he has drawn he concludes that optimal export quantities (in order to return net maximum foreign currency after expenditure of foreign currency as necessary imports for the citrus industry) under post war conditions of demand would be about 2.3 million boxes of oranges to the U.K. and 2.7 million boxes of Shamuti oranges to the continent plus an estimated maximum export of between 1.6 million and 1.8 boxes of grapefruit to all markets. Under pre-war conditions of demand, he asserts that the U.K. could take up to 4 million boxes of Israeli oranges and return net maximum foreign

currency. If Levie's analysis is correct, Israel has already greatly over extended planting of citrus and can no longer get maximum returns/unit of output, but in fact will even have a reduced total return.¹

In Levie's article in the Israel Export Journal, he points to the fact that in the U.S. and in the U.K. where per capita income have risen, per capita consumption of oranges had decreased.

Based on this information, Levie speculates that perhaps in certain markets, oranges should be considered an inferior good (where as income increases, a smaller absolute amount is spent for the purchase of an inferior good and there is therefor a negative income effect, while more money, as well as a greater proportion of income, is spent on other goods where there is a positive income effect.)

A more important and the most complete study of applied consumer research was recently carried out in Great Britain under the direction of Richard Stone, Director of the Dept. of Applied Economics at Cambridge.² Although this study, too, has little precise relevance to

¹Sources given in notes on page 162

²The Measurement of Consumers Expenditure and Behavior in the U.K. 1920-1938, Cambridge, The University Press, 1954

the present, the analytical techniques and the findings are quite different than Levie's for the pre-war period.

The income elasticity of demand for oranges (that is, the proportionate change in purchases of oranges/ the proportionate change in income) was nearly unity. This means that on the average it was found that the proportion of income spent on oranges was very nearly the same both before and after income changed, so that as income rose the total expenditure on oranges rose in direct proportion to the rise in income. This can hardly be considered an inferior good! Price elasticity of demand (that is, the proportionate change in the purchases of oranges/ the proportionate changes in the prices asked for oranges) was also found to be about unity. This means, that over a range of prices, total expenditure on oranges will be inversely proportionate to a change in prices. If prices rise 10%, expenditure will probably decline by a like proportion etc. Furthermore, substitution elasticity for oranges, (that is, the relative increase in the ratio between oranges and another good/the relative decrease in the marginal rate of substitution of oranges in terms of another good) were found to be high in regard to dried fruits, bananas, fresh vegetables and imported apples, but these elasticities were not found to be significant statistically.

Other food demand responses were found to be predominantly inelastic, which means that generally, for most basic foods, the English consumer, tended to purchase a fairly constant quantity, regardless of changes in prices and incomes. It seems then in the case of oranges as distinct from most other foods there were proportionate changes in consumption in regard to income, orange prices, and prices of other substitute goods. The nature of these responses, if they will reproduce themselves in the future might very well indicate that:

- 1) As income rises, orange consumption will rise proportionately;
- 2) As orange prices change, orange consumption will change in inverse proportion;
- 3) As prices of other substitute goods change in relation to prices for oranges, orange consumption will change in greater than inverse proportion, in this most important market, the United Kingdom (if pre-war economics relations re-establish themselves.)

Other published estimates of the elasticity of expenditure on food during the post war years in France, Netherlands, Sweden and the U.S. as well as a broader study conducted by F. A. O. including underdeveloped countries as well as developed countries, show similar income-price-demand relations. However, in comparing the studies, the F. A. O. noted "that it would be erroneous to attribute any high degree of significance to estimates of

elasticities of expenditures on food. They are rather to be regarded as indicators of the general order of magnitude of the response to income changes."¹

The preceding survey of orange consumption was based on changes in per capita consumption as against changes in relative price and changes in per capita real income. Although there is no real comparability (because of the still relatively unadvanced state of statistical measurement) not only between changes in one nation to changes in another, but indeed changes in any one nation over a period of time, these measures were undertaken to show approximate changes under static assumptions. Another view arose, however, to challenge even these approximate comparisons. The question was raised that changes in real income do not reflect changes in consumer expenditures over time since it ignores the effect of changes in the tax rate. The writer set about to check if any significant differences might appear if real disposable income data (net of taxes) were used. The findings show that no significant differences appear for consumption traits (although some differences did appear in the effect on savings).

¹F.A.O., The State of Food and Agriculture 1957, p. 86

Thus for all continental European countries the change in orange consumption seemed to follow along the lines of changes in general private consumption expenditure (in fact, even more than unitary change). The case for the U.K. and Ireland however, shows, again a decline in orange consumption in the face of a rise in general private consumption expenditure, as is shown in the following table.

Estimates of Real Per Capita Private Consumption Expenditure (Index nos. 1951=100) and Per Capita Consumption of Oranges (in kilograms) in Western European Markets, Pre-war to 1955

<u>Market</u>	<u>Pre-war</u> (1934-1938)		<u>1949-53</u> (Annual Aver.)		<u>1954</u>		<u>1955</u>	
	per capita expend iture	per capita O. Con sume.	per capita expend iture	per capita O. Con sume.	per capita expend iture	per capita O. Con sume	per capita expend iture	per capita O. Con sume
Austria	--	3	100	3	116	5	128	7
Belgium	--	11	102	15	107	15	--	16
Denmark	96	3	102	7	107	9	105	8
France	100	7	98	14	108	18	114	19
W. Germany	101 ¹	5	100	7	107	11	117	16
Ireland	84	7	98	6	100	6	107	6
Netherlands	101	10	103	9	110	13	120	15
Norway	84	10	104	10	112	17	116	18
Sweden	--	8	101	14	108	15	111	14
Switzerland ²	83	8	96	14	102	12	--	16
United Kingdom	99	13	100	8	106	8	108	8

Sources: UN Statistical Year Books, 1948-1956; UN. Statistics of National Income and Expenditure, Sept. 1955-53 U.S.D.A. (Information and Data), op. cit. UN. National Income Statistics 1938-48, O.E.E.C. Statistics of National Product and Expenditure 1938, 1947 to 1952.

¹ 1936, territory now comprised by the Federal Republic

² Estimates of real per capita income for Switzerland

It, therefore, appears that since changes in income were positively correlated with changes in orange consumption in the continental markets and were not so in the U.K. and Ireland, this method does not offer a determinate predictive value for all markets. An alternate view, showing changes in per capita consumption of all fruits counter posed against changes in consumption of citrus in each of the Western European markets, illustrates all the more the indeterminateness of statistical solution.

Whereas consumption of all fruit per capita increased by more than proportionate (unitary) rates in all markets except Switzerland and the U.K. when examined against changes in income, the changes in citrus consumption varied widely from market to market when measured against changes in total fruit consumption.

Thus changes in citrus consumption increased by about twice as much as changes in total fruit consumption in W. Germany, Austria, Switzerland and France, and increased by about 2/3 more in Denmark and Norway, while for Sweden and Netherlands both total fruit consumption and citrus consumption increased at about the same rate. On the other hand, while total fruit consumption increased about 287% more than pre-war for Belgium, the increase in citrus consumption was only at a rate of half that amount, 145%.

Irish consumption of all fruit increased by 133% from the pre-war period while citrus fruit consumption fell to 86% of its pre-war pattern. The United Kingdom's total fruit consumption also fell from its pre-war pattern but at a much slower rate than citrus fruit. That is, while U.K. consumption of all fruit was at about 97% of its pre-war consumption pattern, citrus fruit consumption was only at about 61% of its pre-war consumption pattern. These relations are illustrated in the following table:

<u>Markets</u>	I Pre-war Fresh Fruit Av. Con- sumption. (Kg.)	II 1953/4-1955/6 Fresh Fruit Av. Consumption (Kg.)	III II as a % of I (%)	IV Citrus Fruit Consumption in 1955/6 as a % of Pre-war (%)
Belgium	28	80	287	145
Sweden	34	60	173	175
Denmark	30	52	172	267
W. Germany	42	66	157	320
France	29	44	151	270
Netherlands	33	51	133	150
Ireland	20	26	131	86
Norway	31	40	128	180
Austria	42	51	122	233
Switzerland	84	85	101	200
U. K.	42	41	97	61

Sources: F.A.O. Monthly Bulletin of Agricultural Economics and Statistics, February 1957, U.S.D.A. (Information and Data) op. cit.

Thus, changes in total fruit and citrus fruit consumption vary from market to market without any apparent fixed relationship and with no fixed income relationship.

The differences in total fruit consumption and citrus fruit consumption might also be explained by shifts in relative prices. Thus wholesale prices of domestic fruit in England increased by over 200% in the post war years from the pre-war period while the prices of oranges increased by over 300%.¹ However, similar changes in the relative price structures have occurred in Germany with opposite shifts in consumption preferences.²

Again, it appears, that relative price and income analyses offer no determinate predictive value as to future changes in citrus demand. The technique of sample surveys of consumer tastes and preferences has been suggested as perhaps a more "fruitful" approach. It has also been suggested that demand for oranges seems to have declined so disproportionately in the U. K. owing to the large substitution of milk, ice cream and confections as a between meal refreshment, but here again, only consumer surveys can give a more definite answer.

In summary, it could be said that per capita citrus consumption has changed in direct proportion with changes in

¹F.A.O., Commodity Series, Citrus and Dried Fruit, Dec. 1950, also F.A.O., Fruits and Vegetables, Production Trade and Policies In Europe 1947-51, October 1952.

²F.A.O., Monthly Bulletin of Agricultural Economics and Statistics, Feb. 1957, p. 4.

real per capita income in the continental markets of W. Europe, and autonomous negative shifts seem to have occurred in citrus consumption in the U. K. The permanency or secular long term nature of consumption patterns, however, remains indeterminate.

THE EUROPEAN COMMON MARKET AND CITRUS

One additional problem remains to be confronted: What effect will the European Common Market have on the pattern of citrus imports and exports?

The participating countries in this scheme include Belgium, France, W. Germany, Italy, Luxembourg and the Netherlands. Five of these countries (excluding Italy which is a major citrus producer) imported an annual average of 1,254,200 metric tons of oranges, 146,100 metric tons of lemons and 27,700 metric tons of grapefruit between 1953 and 1955; of which the Common Market countries, Italy and Algeria (related through France) supplied 22% of total orange imports, 63% of total lemon imports and 10% of total grapefruit imports. If Morocco and Tunisia are included (through their customs relations with France) the segment supplied by participants in the Common Market will be appreciably increased (an additional 10% of the total of orange imports, 3% of lemon imports and 18% of grapefruit imports).

The main Middle Eastern producer to be affected by the development of the Common Market is Israel who supplied only 2% of the total orange imports of the Common Market countries and about 35% of their imports of grapefruit between 1953-1955.

The direct effect on Israeli grapefruit export is not likely to be important since the Common Market participants do not supply much grapefruit (nor has there been until now any evidence of an increase in new plantings of grapefruit in these countries). Israel will be faced for grapefruit exports in this market with an ad valorem tariff of 12% (which is at present higher in Benelux and France, and lower in Germany.)¹

The direct effect on Israeli orange export is liable to be quite important since the tariff for external oranges will be 20% ad valorem to the Common Market.² This will give Italy important price advantages in the Common Market, and induce her not only to redirect her exports from other markets, but to further increase her rate of new plantings which now are scheduled to increase her orange production by nearly 100,000 metric tons in 1960.³

¹F.A.O., Monthly Bulletin of Agricultural Economics and Statistics, July/August 1957, p. 18

²ibid, p. 17

³ibid.

Although nearly all of French North African citrus exports go to France, the pace of their new plantings is likely to be further stimulated by the widening of their protected market. While it isn't seriously contended that Italy and North Africa will be able to supply all of the orange demand of the Common Market, the fact of the probable increased growth of citrus among the citrus producing participants will tend to limit Israel's possibility of increased exports to this most important market group (although this group hasn't been since the foundation of the state a major outlet for Israeli citrus in increasing its production, Israel had hoped to increase its exports significantly to the five non-citrus producing participants of the Common Market).

A secondary effect of the Common Market will possibly be to increase Spanish, U. S., South African and Brazilian competition with Israel for the markets outside the Common Market, since these producers will probably tend increasingly to redirect their exports also.

Another indirect effect, for the long-term, and possibly the most important effect is in the area of other fresh fruit substitutes. With implementation of the Common Market, trade among member countries of

domestically grown fruits, such as apples, pears, table grapes and peaches, is likely to increase, which would affect the demand for citrus fruit and bananas from outside the Common Market area."¹

All in all, it can only be supposed that these developments can only have a downward influence on the prices received for Israel citrus over the next few years.

¹ *ibid*, p. 18

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