

Fruit of the Earth

by STANLEY MEHR

MOST OF OUR many kinds of fruit originated in China and southwestern Asia—not far from where the Garden of Eden is supposed to have been. The original stocks have changed considerably over the centuries and have traveled far from their birthplace.

Fruit is grown nearly everywhere now, but commercial production has developed the most in Europe, North America, and below the Tropic of Capricorn.

Nearly all fruit once was grown in backyards, farmyards, and in small orchards or vineyards or berry patches and eaten locally. Less and less of our fruit now comes from home or farm gardens and general farms.

To grow and pack acceptable fruit nowadays that will satisfy the consumer requires specialization.

Insects and diseases have to be combated. Pollination, fertilization, cultivation, irrigation, frost protection, pruning, thinning, selection and grafting of varieties, grading, storage, and marketing must be carried on properly. Machines, special buildings, and money are needed. If the fruitgrower is to make out financially, his enterprise must be large enough to employ modern techniques efficiently.

Plant scientists strive to perfect varieties that have excellent flavor, but shipping and keeping quality is vital when so many of us are far from the

place where the fruit was grown: We expect to have fruit long after the harvest season. We like to have lemons all year and apples in May, even if they were harvested in September.

A shifting of acreage to regions best suited to fruit has been pronounced, particularly for deciduous fruit, like apples, pears, peaches, apricots, and prunes.

In the United States, the world's largest producer of apples, this trend is an old story. Apple production even before the Second World War was concentrated on the west coast, particularly in Washington, and in New York, New England, the Appalachian region, and Michigan. The concentration of pear growing on the west coast has been even more striking.

The same thing has been happening all over the world. In France, as an example, heavy plantings of pears have been made in the Rhone Valley. The Bolzano-Merano, Emilia-Romagna, and Po Valley sections of Italy have become important suppliers of apples and pears. In Australia, the States of Victoria, New South Wales, and South Australia (particularly in apricots) more and more dominate in the production of clingstone peaches, pears, and apricots, as Tasmania does in apple orchards.

In the Republic of South Africa, the southwestern districts of Cape Province account for an overwhelming percentage of the country's deciduous fruit, including grapes. The Argentine apple and pear crops come mainly from the big Rio Negro Valley and Mendoza Province. In apricot production in the United States, the world's leading producing country, California is dominant, as it is for clingstone peaches, grapes, plums, and prunes, among others.

As to citrus, however, crops such as oranges found their most suitable locations many years ago and have shifted little from their original sites. California has yielded first place to Florida as producer of oranges; groves in California have been subdivided

for housing, and Florida has benefited from the development of frozen concentrated juice.

Ecuador, once a minor producer of bananas, has become the leader.

Production has risen sharply in Costa Rica, Guatemala, Honduras, and Panama, but has declined sharply in Mexico and Nicaragua. Trends are divergent in the Caribbean Islands—up in the Dominican Republic, Guadeloupe, Martinique, and the Windward Islands but down in Jamaica.

The acreage in pineapples has shifted little, although fairly sizable new plantings have developed in Africa—particularly in the Republic of South Africa—and Australia.

JUST AS remarkable as the shifting of acreage the world over has been the almost universal increase in production of nearly every kind of fruit that is of commercial significance because of expanded plantings and improved yields. In fact, the increase in production has been larger than consumption in places, and marketing difficulties have been cropping up.

A factor that may encourage greater consumption is the move toward better grades and standards.

Relatively few shippers before the war consistently packed fruit for export that met any reasonably high standards of quality. A few governments insisted on uniform grades and minimum standards for fruit going into export, although the United States enacted an Apple and Pear Export Act in 1933 that provided for mandatory minimum export standards.

Now many foreign exporters use improved grade standards and pack their produce in efficient, attractive containers.

A number of countries require that their exports meet minimum standards and be graded according to government specifications. Importers and consumers thus are assured of the quality and grade.

The European Common Market has shown interest in having only

fruit graded as to quality and condition sold in the six countries—Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany. Beginning in August 1962, only fruit of so-called Quality II or better could move from one member country to another or could come in from an outside country. The regulation applied to apples, pears, apricots, peaches, plums, sweet oranges, tangerines (mandarins and clementines), lemons, table grapes, cherries, and strawberries in 1964.

FRUIT bulks large in world trade.

West Germany, the leading importer, bought fruit and fruit products valued at 598 million dollars in 1962.

The United Kingdom ranked second with imports valued at 546 million dollars; France was third (299 million); and the United States was fourth (203 million).

Italy had exports valued at 346 million dollars and the United States 302 million dollars. Spain exported 211 million dollars of fruit and fruit products. The Republic of South Africa exported fruit worth 97 million dollars; Australia, 68 million; Greece, 52 million; and Ecuador, 41 million.

Canada imported fruit worth 174 million dollars; exports amounted to 19 million dollars.

As large as international fruit trade is, it would be still larger were it not for restrictions against imports imposed by a number of countries.

The restrictions are imposed mainly for two reasons—shortage of foreign exchange or protection of the marketings of domestic producers or of the producers in associated oversea territories from import competition.

The restrictions may take various forms, such as outright embargo of imports, imposition of quotas, admittance only during certain seasons, minimum price requirements, grade or packaging standards, or limiting entry to selected varieties.

APPLES are grown in the temperate-climate countries. They can withstand

cold weather and hot summers but are not productive in places where winters are warm.

According to Dr. John R. Magness, of the Agricultural Research Service, an authority on the origin of plants, the species of apple from which our present varieties originated probably started in southeastern Asia, somewhere between the Caspian Sea and the Black Sea.

The largest producer, the United States, averages 2.81 million short tons of dessert and cooking apples annually of a world total of 12.9 million. (The production statistics I cite do not include the Soviet Union and some countries where production is negligible.)

When cider apples—the varieties suitable only for cider—are taken into account, France is the world's largest producer of apples, with 3.0 million tons. French production of cider apples, 2.5 million tons, dwarfs that of any other country. The famed cider apple trees of Normandy are being removed, however, and dessert varieties are being planted in other parts of France. For dessert and cooking apples alone, Italy is second to United States with 1.6 million tons.

West Germany is third with 1.5 million tons.

Other major producers are Japan (0.9 million), United Kingdom (0.6 million), France (0.5 million), Argentina (0.4 million), and Canada (0.3 million).

The world's largest exporter is Italy, with an annual average of 0.5 million tons. World exports in the same period (1956–1959) averaged 1.3 million tons. Italy's exports, therefore, accounted for three-eighths of all table apples in international trade.

Other principal exporters, and their exports in short tons, are Argentina (0.1 million), Australia (0.1 million), mainland China (0.08 million), the Netherlands (0.08 million), the United States (0.07 million), Canada (0.05 million), and Hungary (0.04 million).

Australia depends on exports as an outlet for nearly 40 percent of its apple

crop. Italy, Argentina, the Netherlands, and China export about 25 to 30 percent of their crops. Hungary exports more than 20 percent of its crop; Canada, about 15 percent. The United States exports less than 3 percent of its crop.

West Germany leads the world as a market for the exporting countries—it imports an average of 400 thousand tons annually. The United Kingdom is second with 200 thousand tons a year; the Soviet Union is third with 100 thousand tons. Other important importers are France (50 thousand), Switzerland (50 thousand), Sweden (40 thousand), East Germany (30 thousand), and Brazil (30 thousand).

The varieties are legion. The main variety in the Western Hemisphere is the Delicious and its red forms in the United States, Argentina, and Chile. The McIntosh is first in Canada and next most important in United States. The Winesap, Jonathan, Rome Beauty, Golden Delicious, York Imperial, and Northern Spy also are leaders in the Western Hemisphere.

Sturmer Pippin, Jonathan, Granny Smith, and Delicious predominate in Australia. Others include Democrat and Cox's Orange Pippin. In New Zealand, too, these are generally the main varieties. In South Africa, Red Delicious of various types, Golden Delicious, Winter Pearmain, and the Dunn's Seedling are the leaders.

Cox's Orange Pippin is the leading dessert apple and Bramley's Seedling is the main cooking apple in the United Kingdom.

Cox's Orange Pippin, Ingrid Marie, Jonathan, Belle de Boscoop, and Gravenstein lead in Scandinavia.

Belle de Boscoop, Jonathan, Golden Delicious, and Cox's Orange Pippin are favorites in the Netherlands. Plantings of Golden Delicious have been made in Scandinavia and on the Continent, notably in France. Golden Delicious has been growing greatly in popularity in western Europe. Other major varieties on the Continent include Abbondanza (number one in

Italy), Reinette du Canada, Reinette de France, Reine des Reinettes, Delicious, Rosa del Calfora, Transparent, James Grieve, and Finkenwerder.

ORANGES grow under widely varying conditions as long as there is not too much frost. A temperature of 25° F. causes some injury; temperatures below 20° injure or kill the trees.

The United States produces 4.5 million short tons of a world total of 12.6 million. Spain is second with 1.2 million; Japan is third, 1.0 million; and Italy is fourth, 0.8 million. Tangerines are included in those figures.

Other major producers are Brazil, Mexico, Argentina, Israel, Morocco, Algeria, and the Republic of South Africa. The United Arab Republic, Greece, Turkey, Cyprus, Lebanon, and the West Indies also produce a good deal. India and China grow many oranges but are not included in the above world total because usable statistics were unobtainable.

In international trade there are just two seasons of the year for oranges—summer and winter. Summer means May to November. In many Northern Hemisphere countries during these “summer” months, Valencia oranges from California are sold in competition with Washington Navels and Valencias from South Africa and the Bahianinha (little navel orange) and Pera from Brazil. All of these are the nonblood oranges; that is, oranges that do not have red coloring of the flesh. While the Southern Hemisphere oranges are new-season fruit, the California Valencias have been “tree stored” for summer marketing.

The characteristics of summer oranges from different origins are not necessarily similar. Brazil’s oranges are of tropical quality, rather similar to Florida’s, but South African fruit is of rich color similar to that of oranges of California or the Mediterranean.

Since the Washington Navel and Valencia varieties are so important in the world’s orange production, some description of them is in order.

The former is a seedless or nearly seedless orange of medium to large size and a slightly oval shape. The peel is usually thick, with a very smooth external texture. The fruit is particularly good for eating out of hand, since the segments can be separated from each other intact. Under favorable conditions the navel is of excellent quality and sells as a fancy fruit. The “navel”—on one end of the fruit—is not always conspicuous.

The Valencia is a thin-peeled variety, late maturing, of medium to large size. It has few seeds. The flesh has a fine, tender texture, and the variety is well known for its abundant juice of excellent flavor.

In western Europe, the leading import market for oranges, summer oranges account for 15 percent of the year’s imports and winter oranges for 85 percent.

The “winter” season runs from November to July. This overlaps a little with the summer season because South Africa or California may have begun to ship summer oranges while the Mediterranean is finishing the winter season with some June shipments. Winter oranges dominate European imports, and they also represent the larger part of consumption in the United States, although not necessarily in the form of fresh fruit; 90 percent of the year’s orange juice is produced during the winter.

All United States oranges are nonbloods. The most important varieties are the Washington Navel and Valencia in California. In Florida the most important are the early Hamlin and Parson Brown, the midseason Pineapple, and the Valencia—the main variety for both fresh fruit and juice. The Hamlin is rather small and slightly oval. It has a smooth, fine-textured skin. It is usually seedless, although one to five seeds may occur in occasional fruits. The Pineapple is usually round and thick-skinned and possesses a few seeds, usually 8 to 15. Its juice is abundant and of rich flavor.

Many varieties not known commer-

cially in the United States are produced during the winter season in other countries.

Washington Navels account for 25 percent and seedless nonbloods 13 percent of the Spanish harvest. The latter include the Salustiana, which is earlier than the Navel and the Cadenera. Both are fine fruits. Late-season Spanish oranges, harvested March to June, round out the nonbloods and account for 12 percent of the Spanish crop. The Verna is the most important late orange. Some Valencias are also grown. Blood oranges as a group comprise 39 percent of Spanish production and are mostly Doble Fina, a fine, oval-shaped variety.

North Africa produces highly colored table oranges similar to Spain's. Navels are important in Morocco and Algeria. Also important in Algeria are an oval nonblood called Maltese and an oval semiblood called Portuguese. A considerable acreage of Valencias is in Morocco.

Nearly all of the oranges grown in Italy are the blood type. Moro, Tarocco, and Sanguinello are outstanding. The peel is highly colored, and the juice has a dark pigment. A glass of orange juice in Italy may be as red as wine. Some Italian varieties have characteristics of navels.

Israel, an important source of winter oranges, produces mostly a large, nearly seedless table orange, the Shamouti. The well-known Jaffa is a trade name for the Shamouti. Israel also produces Valencias for late-season sale.

Oranges cannot be classified seasonally the world over, for somewhere in the world the early navel and the late Valencia are harvested every month of the year.

The international trade in oranges averages more than 2.6 million tons annually.

Spain, the leading exporter, ships nearly 700 thousand tons a year on the average. United States and Israel are in second place with 300 thousand tons, followed by Morocco, Italy, Algeria, South Africa, and Brazil. The

main importing countries are France and Germany, 500 thousand tons; the United Kingdom, 400 thousand; Canada, 200 thousand; and the Netherlands, 150 thousand. The Soviet Union imported 90 thousand tons each year in 1956-1959.

PEARS follow apples among the tree fruits in importance.

Approximately 4.4 million tons of table pears and 0.6 million tons of cider pears are produced annually. France accounts for most of the world's cider pears.

The United States and mainland China (with more than 0.7 million tons each) are the leaders in growing pears. Italy is third, with more than 0.5 million tons, followed by West Germany (0.4 million), Japan (0.2 million), and France (0.2 million). These figures are averages. Actually, Italian, French, and German production has been expanding, and the most recent harvests are much larger than those averages. The Netherlands, Argentina, Turkey, Australia, South Africa, and other European countries also grow substantial quantities.

About 300 thousand tons of table pears move every year in export channels, although only a few countries export pears. Italy dominates the export trade in pears as well as in apples. Other exporters are Argentina, the Netherlands, the United States, the Republic of South Africa, Australia, Belgium, and Japan.

Many pears move in international trade in cans. From the 1961 crop, the equivalent of about 88 thousand tons of fresh pears were exported, of a world production of canned pears equivalent to more than 375 thousand tons of the fresh fruit.

The leading varieties of pears are Bartlett (known as Williams or Bon Chretien abroad), Passe Crassane, Kaiser, Dr. Jules Guyot, and Conference in Europe; Bartlett and Packham's Triumph in Australia, South Africa, and Argentina; Kieffer, Bartlett, and D'Anjou in Canada; and

Bartlett, D'Anjou, Bosc, Comice, and Nelis in the United States.

BANANAS grow everywhere in the Tropics—in front yards, jungles, small commercial plots, plantations.

Plantains, also known as cooking bananas and as *Musa paradisiaca* and *Musa fehi*, are a first cousin of the banana that we are all familiar with, *Musa sapientum*. Plantains, though, remain starchy when ripe and are not palatable except when cooked. They are of great importance in tropical America and Africa and are considered an excellent food.

Because many countries do not distinguish between bananas and plantains in their statistics, it is difficult to say how many bananas are produced. A guess is 35 million tons (inclusive of some plantains), which is greater than the combined production of apples and pears (exclusive of cider fruits), plums, peaches, cherries, and apricots.

Bananas grow best in hot, humid regions, where temperatures do not fall below 55° and seldom rise above 105° and rainfall is abundant throughout the year. Irrigation is necessary where rainfall is light during certain periods of the year.

The banana, a nonwoody plant, is related to the canna lily and the orchid. The "trunk" of the banana plant consists of overlapping leaf sheaths. Pulling the plant apart is much like taking apart a stalk of celery. It is easily blown over by heavy winds, especially when mature and bearing fruit, as it is topheavy at that time. In Central America, millions of the plants are blown down during "blowdowns," with great loss of fruit. Bananas take a short time to come into bearing. The first fruit from new plantings is ready to harvest 10 to 13 months after planting.

The chief variety in world trade is the Gros Michel, although numerous varieties are cultivated. The fruit is large and ships well. Cultivation of Cavendish-type varieties has been ex-

panding because they resist fusarium wilt (Panama disease). The susceptibility of the Cavendish to bruising in transit is less of a problem now that more and more bananas are packed in boxes at the plantation and move from plantation to retailer in them.

Seven Latin-American countries—Ecuador, Honduras, Costa Rica, Panama, Brazil, Colombia, and Guatemala—and the Canary Islands export nearly three-fourths of the bananas that move in world trade.

Ecuador alone accounts for one-fourth of the world's exports. Before the war, Ecuador's exports amounted to 2 percent of the total. Several factors have contributed to the great increase. The coastal lowlands of Ecuador have a hot, humid climate, fertile soil, and an abundant rainfall during 4 or 5 months of the year. High winds are rare, and the risk of blowdowns is less. Sigatoka disease was little known before 1956-1957, and Panama disease is less serious than in older producing countries.

GRAPEFRUIT is the second most important citrus fruit in terms of quantity. The quantity, however, is much smaller than that of oranges, and grapefruit are a less popular item in international trade than oranges or lemons. Thus, while about one-fifth of the oranges and lemons enter international trade, less than 10 percent of the world's grapefruit are exported.

Actually, grapefruit can be considered an American specialty; the United States produces nearly nine-tenths of the world's crop, consumes about five-sixths of the world's crop, and accounts for nearly half of the world's exports.

The grapefruit may have originated from the pummelo or shaddock, which probably was native to the Malay Archipelago and the East Indies. The pummelo fruit has the color and general appearance of a large, coarse-skinned grapefruit. Its membranes are extremely tough. It very likely reached Europe by the middle of the

12th century and was grown, mainly as a garden curiosity, under the name "Adam's apple." Seed of the pummelo are said to have been left in Barbados by a Captain Shaddock, master of an East Indian ship. The grapefruit probably developed in the West Indies as a mutation from the pummelo.

The grapefruit as such was first described in 1750 growing in Barbados.

The name "grapefruit" may have arisen from a belief that its flavor was like that of a grape or from the fact that the fruit is frequently borne in clusters.

Most grapefruit is harvested November to June, but some is harvested during the summer in California, South Africa, and Argentina.

Marsh Seedless is the leading variety. Red Blush is grown in Texas. Some red and pink grapefruit are also raised in Florida. The seeded Duncan variety is used in Florida for canned grapefruit sections, but other countries use the Marsh variety for canning.

The United States ships more than 80 thousand tons annually. Israel ships about 50 thousand tons. The Caribbean area, South Africa, north Africa, and Cyprus also export some grapefruit. Exports of canned grapefruit are minor.

LEMONS, in terms of volume production, are the third most important citrus crop, although they are more widely grown and are much more important in international trade than grapefruit. For the world as a whole, about 1 box of lemons is produced for every 10 of oranges.

The lemon (*Citrus limon*) and lime (*Citrus aurantifolia*) are related. Their native home may have been the warm, humid district east of the Himalayas, in northern Burma, and in eastern India. The Arabs established the lemon and lime in the Middle East, whence they probably were brought to Europe by the Crusaders. Columbus brought lemons and limes, as well as oranges, to the New World.

The lemon that most of us are famil-

iar with is the "acid" lemon. The lemon grown in the warmer, more humid regions is "acidless" and relatively bland and is of no significance in international trade. Actually, the lime is the "acid" citrus of humid regions, such as Central America and the Caribbean, but it is produced in smaller volume than the lemon.

The United States raises more lemons than any other country and is the second largest exporter. Italy is second in production and the leading exporter. Other producing countries are Argentina, Spain, Greece, Turkey, the United Arab Republic, Chile, Lebanon, Israel, and Cyprus.

California and Sicily grow most of the United States and Italian lemons. A Mediterranean or California-type climate is best suited to growing acid lemons. The Eureka is the main variety in California.

In Sicily the Femminello, Monachello, and Interdanato are the chief varieties. Italians, though, seldom speak of varieties, but rather in terms of blooms. Thus, the usual expressions "Primofiore," "Limoni," and "Verdelli" refer not to varieties but to time of bloom and the season of harvest. Primofiore means "first flower" and the crop is harvested from September to the end of November. Limoni, harvested from December to June, are the main crop and are also known as winter lemons. The Verdelli, meaning green, are summer lemons, an important crop, and are usually green.

Spain is the third most important source of export lemons, and also grows, near Murcia, a lemon known as Primofiori—in this case, the name of an early variety rather than a bloom. The major variety in Spain is the Verna or Berna. This is the same name as for the Spanish late orange. It is a large, thick-skinned fruit that is tree-stored for summer harvest and has a preferred market in Germany.

Western Europe and the United States use about the same quantity of lemons, and between them consume most of the world's lemons.

Germany is the leading importer, followed by France, the United Kingdom, and the Soviet Union. Most lemons are used as fresh fruit. They are also a source of essential oil (from the peel) for flavoring. They may be processed for their juice.

PEACHES, *Prunus persica*, may have originated in China.

International trade in peaches has soared, as production and exports have soared in Italy and France.

Italian and French shippers believe that consumption of peaches will expand a great deal in Germany, the United Kingdom, and northern Europe when the prices are lower and supplies are available over a longer season.

There were 36.7 million peach trees in Italy in 1961 and 18 million in 1950; production in 1961, 1962, and 1963 averaged more than 1.1 million tons; the average 10 years earlier was 400 thousand tons.

French growers foresee crops of more than 500 thousand tons; the average has been less than 200 thousand. In 1962, Italy produced about twice as many peaches as all the other European countries together.

Large as the Italian production is, it is overshadowed by that of the United States, which raised 60 percent more peaches than Italy in 1962. United States exports of fresh peaches, however, are small compared with Italy's, but the United States exports a large amount of peaches in cans.

The Freestone varieties of peaches are those that we eat fresh; some are canned; a few are dried. Clingstone peaches are admirably suited for canning; hardly any are eaten fresh. About 65 percent of United States production is Freestone, and 35 percent is Clingstone.

European peaches are almost entirely Freestone, aside from a few in Spain. Australia, the Republic of South Africa, Japan, and Argentina, producers and exporters of canned peaches, too—though of much smaller

volume than the United States—also grow Clingstones and Freestones.

The world trade in fresh peaches amounted to 331 thousand tons in 1961. Of this, Italy shipped 260 thousand tons—nearly 80 percent. Greece was second with 29 thousand tons, and the United States was third with 17 thousand tons. West Germany was the main import market, taking 206 thousand tons. Switzerland, the United Kingdom, and Canada each imported about 20 thousand tons.

At the same time, world trade in canned peaches was equivalent to 225 thousand short tons of fresh fruit, of which the United States supplied the fresh fruit equivalent of 123 thousand tons. South Africa shipped out canned peaches equivalent to 39 thousand tons, fresh. The United Kingdom is the world's largest importer of canned peaches, and West Germany is next.

PLUMS, APRICOTS, AND CHERRIES are of much less importance in world commerce than the tree fruits I have mentioned. The fresh-fruit trade in the three combined is about half of that of peaches or pears.

World production of plums, cherries, and apricots has averaged 3.5 million, 1.3 million, and 0.9 million short tons, respectively.

The leading producing areas of plums (including prunes) are eastern and central Europe and the United States. Yugoslavia, Rumania, Germany, and the United States are the world's largest plum producers. Czechoslovakia, France, the United Kingdom, Italy, and Hungary are also important producers. Many others grow plums.

A good many of the prune-type plums are dehydrated or sun dried and are possibly the best known form of the prune, the dried prune.

Of a world production of 3.5 million tons of fresh plums (and prunes), 650 thousand tons have been used to make dried prunes; well over one-third of these, the equivalent of 250 thousand tons of fresh fruit, or 80 thousand tons of dried prunes were exported.

The United States is the giant in the production and exportation of dried prunes—entirely a California product, except for a minor tonnage from Oregon. Yugoslavia is the next largest producer and exporter. French production of dried prunes has been rising rapidly because of new plantings in the Garonne Valley. Plum jam is a popular product. In central and south-eastern Europe, large quantities of prunes are used to make brandy.

Cherries are grown in volume in many countries, but not many fresh cherries are exported. The perishability of the fruit and the difficulty of packing it for long-distance transportation limit the foreign trade in cherries.

The United States generally has the largest cherry crop, but if we were to relate cherry production to size of the country, a number of European countries would rank higher than United States as cherry producers. West Germany, Italy, France, Yugoslavia, and Switzerland, among others, would be ahead of the United States on that basis. Japan, famed for the flowering cherry, ranks far below most European countries in the fruiting cherry.

There is some exportation—mainly from the United States—of canned cherries, but it is a relatively minor item. There is also some international trade in jam, glacé cherries, and cherries in brine. France and Italy are the main producers, respectively, of the last two items. Brined cherries are made into maraschino or glacé cherries. West Germany is the leading importer of fresh cherries.

The name "apricot" stems from a Latin word that means "early ripe." Because it blooms early in the spring, apricot blossoms usually are killed by frosts in the Eastern States.

The fruit tends to crack badly and decay in warm rainy weather and so is difficult to grow in tropical regions. As a result, the raising of apricots in the United States is confined to the Far West, mainly California, and in Europe mainly to places with Mediterranean climates.

Favorable locations are also in northern Africa, Asia Minor, China, the Republic of South Africa, Australia, and Argentina. As a result, the production of apricots is smaller than of any of the fruits I have discussed and averages somewhat less than 900 thousand tons for the whole world.

Spain, France, Italy, and Yugoslavia, in that order, are the chief European producers. The United States, though, is the world's largest producer. Canada, Hungary, Czechoslovakia, Austria, and Switzerland also produce some apricots.

International trade is limited. The production (because of weather) and trade fluctuate sharply from year to year, but on the average about 50 thousand tons a year of the fresh fruit enter international trade. Spain, Hungary, and Italy do most of the exporting. West Germany, Switzerland, and France do most of the importing.

An even greater tonnage, equivalent to more than 50 thousand tons of fresh fruit, is exported as canned fruit. About 15 thousand tons of dried apricots, made from approximately 100 thousand tons of fresh fruit, also move annually in international trade.

Iran dominates in the production and exportation of dried apricots. Sharply declining United States production of dried apricots has not been offset by rising foreign output.

WORLD PRODUCTION of grapes, according to some estimates, has been averaging about 41 million short tons annually. Grape production exceeds that of all the deciduous tree fruits.

Most of the grapes are for wine—usually 70 to 80 percent of the world's crop. About 8 percent of the crop consists of table grapes; that is, varieties grown for fresh consumption, but some of these are also made into wine. Some grapes that are classified as wine, or raisin varieties are eaten fresh.

About 6 percent of the world crop is dried into raisins. Grapes are also crushed and consumed in the form of unfermented juice. Some grapes are

also made into jelly. In the Middle East they are used as sugar; the grapes are crushed and most of the juice boiled off leaving a sirup of high viscosity, which serves as a sweetener for much of the farm population. A few grapes are canned, mostly for fruit cocktail.

Like the banana, the grape dates from prehistoric times. The Old World or European grape, *Vitis vinifera*, has been cultivated so long that its exact place of origin cannot be determined.

Seeds of grapes have been found in the oldest tombs of Egypt. The Egyptians probably grew grapes and made wine 6 thousand years ago. The oldest Hebrew, Greek, and Roman writings refer to grapes and winemaking. Apparently the vinifera grape originated in the region of the Caspian and Black Seas. The Vikings apparently found wild grapes so abundant in North America that they called North America Vineland.

Today's American varieties derive from the native wild grapes; in the South, the Muscadine varieties, from the species, *V. rotundifolia*, and in the North, varieties as the Concord and Niagara from *V. labrusca*.

Many varieties of Europe, which produces nearly 80 percent of the world's grapes, are mostly grown on roots partly or wholly of American stock. The reason is a root louse, phylloxera, which was native to eastern America and was accidentally taken to Europe over a century ago.

Since some American grapes are resistant to this sucking insect, the introduction of American rootstocks saved the European grapegrower from the American insect. Greater frost resistance in Old World grapes is also obtained by crossings made with American varieties.

In California, Old World varieties are grown on American rootstocks in soils where phylloxera is a problem. The most famous wines are made from Old World grapes.

More grapes are produced in Italy than in any other country of the

world. France is the next largest producer. Although the production of dessert varieties has been increasing, the bulk of the grapes in those two countries is grown for wine. The production of grapes there has averaged 10.4 million and 7.1 million tons, respectively. Spain is third with 3.4 million tons, mainly for wine.

The United States is next with nearly 3 million tons (2.7 million in California), but in the United States wine grapes do not predominate. In fact, only about one-fifth of American grapes are of the wine type.

Raisin varieties account for well over half of the United States crop, but only about half of them are made into raisins. The rest are used for wine or eaten fresh. This diversified usage in the United States is particularly characteristic of the Thompson Seedless, the variety that we know so well as the light-green, sweet grape of the supermarkets in late summer. It also is much used in making dessert wine.

The Thompson Seedless had its beginning in Turkey, where it is known as the Sultanina. It is widely grown in Australia and South Africa.

Other major grape producers are Turkey, Algeria, Argentina, the Soviet Union, Portugal, Greece, Rumania, and Yugoslavia.

Foreign trade in grape products is much greater than the trade in fresh grapes if we convert world exports of wine and of raisins to their equivalent in fresh grapes.

Thus the grapes needed to make the 670 million gallons of wine exported annually would total about 4.5 million tons. The grapes from which the 360 thousand tons of world raisin exports are made would amount to about 1.5 million tons.

Exports of fresh grapes for table use average 510 thousand tons annually, a poor third to the 4.5 million and 1.5 million tons of grapes that go into wine and raisin exports, respectively. The figures for raisins include the so-called dried currant or Black Corinth of Greece—a dried vine fruit that has

been made in Greece for more than 500 years from a small, usually seedless, reddish-black grape.

Algeria has been the world's largest exporter of wine, exporting an average of 362 million gallons annually—more than half the world exports. Most of this wine has gone to France. Far behind Algeria in volume of exports are Spain, Portugal, and France; each ships approximately 50 million gallons yearly. Then come Italy, Morocco, Tunisia, Yugoslavia, Hungary, Greece, Rumania, South Africa, Cyprus, Australia, and West Germany.

France accounts for 450 million gallons of imports a year on the average. Large as France's own production is—about 1.25 billion gallons per year—her imports are equivalent to more than one-third of her vintage. West Germany is the next largest importer. The United States ranks seventh among the wine importers, with an average of 9 million gallons, which has been moving up.

The main table-grape exporting country is Italy. Well behind are the United States and Bulgaria. Spain is next, and well behind Spain are South Africa, France, Hungary, and Greece. West Germany is the biggest importer. Canada and the United Kingdom also import substantial quantities.

There are innumerable varieties of dessert grapes. To mention a few: Regina in Italy; Chasselas and Gros Vert in France; Rosetti and Ohanes (also known as Almeria) in Spain; Rosaki in Greece; and Muscat de Hambourg, Muscat d'Alexandrie, Alphonse Lavalle, Dattier, Ideal, Cardinal, and Emperor in various places in Europe. The Thompson Seedless is number one in the United States for table use. The production of table grapes generally has been increasing.

Only a few countries produce and export sizable tonnages of raisins. In order, they are the United States, Greece, Turkey, Australia, and Iran. Smaller tonnages are produced in Spain, the Republic of Cyprus, South Africa, Afghanistan, and Argentina.

In the term "raisins," we include all dried vine fruits: Thompson Seedless (sultaninas), sultanas (a close relative of the Thompson and important in Turkey, Greece, and Iran), dried currants, muscats, rosakis, and others.

Greece leads the world as an exporter of dried vine fruit, followed by Australia, Turkey, the United States, and Iran.

THE PINEAPPLE (*Ananas comosus*), a native of South America, is one of the most widely grown tropical fruits. It can generally be grown between 25° north and south of the Equator. It is second only to the banana among fruits grown in the Tropics.

A pineapple harvested fully ripe is soft, sweet, and juicy. Its sugar content can increase 100 percent in the last stage of ripening on the plant.

Fully ripe pineapples cannot be shipped very far, so the fresh pineapple we buy in the Temperate Zone was harvested before full maturity and is relatively hard and tart (though still a treat to us who know no better).

Canned pineapple, prized the world over as a dessert, is a cooked fruit.

World production of pineapples is substantially greater than the combined production of grapefruit, lemons, cherries, and apricots. An average world crop in 1951-1955 amounted to 1.7 million tons; in 1957-1961 it had risen to 2.3 million tons.

Hawaii produces nearly half of the world's crop. Brazil, the second largest producer, raises one-fourth as much as Hawaii. Mexico, Malaya, and Taiwan rank third, fourth, and fifth. Malaya and Taiwan have made spectacular gains in production. The Philippines, Cuba, South Africa, and Australia also are heavy producers.

Exports of fresh pineapple average about 85 thousand tons annually. Cuba used to be the leading exporter, but its shipments have declined sharply.

Mexico and Brazil became the largest exporters. Exports from the Azores, a traditional source of fresh pineapple for Europe, amount to 2,500 tons an-

nually—a small fraction of the volume shipped by Mexico or Brazil. Hawaii exports hardly any fresh pineapple.

Exports of pineapple in cans is more important than trade in the fresh fruit. Approximately 400 thousand tons of the fresh fruit are processed into the canned pineapple that enters international trade channels.

As a canner of pineapple, Hawaii outranks other countries. Hawaiian-canned pineapple accounts for more than half of the world's pack. Malaya, South Africa, Taiwan, Australia, Mexico, and Cuba are the other main canners. Hawaii accounts for one-fifth of the world's exports, but Malaya, the Philippines, South Africa, and Taiwan are not far behind Hawaii in the quantities they export.

The United Kingdom, West Germany, and the United States are the big importers. Other substantial importers of canned pineapple are Canada, Japan, France, Sweden, and the Netherlands.

ESTIMATES OF CONSUMPTION of fruit in 12 countries—the United States, Australia, Canada, and nine European countries—have been published by the Commonwealth Economic Committee in London.

The consumption figures are in terms of fresh fruit—processed fruit having been converted to a fresh-fruit basis.

Of the 12 countries for which the committee estimated consumption, Switzerland has had the highest consumption—236 pounds per capita in the 3 years, 1959–1961. The United States usually has been second, with 196 pounds.

Sweden and Canada generally have been third and fourth, about 180 to 190 pounds per capita. West German consumption has been rising rapidly, and in 1959–1961 attained an average of 193 pounds. Swedish and Canadian consumption has also been rising.

The higher the level of consumption, the less is the tendency to increase. Thus, the United States and Switzerland show no gain; Sweden and Can-

ada show slight gains; but countries with a lower base, such as Germany, France, Italy, and Spain, have shown marked gains.

British consumption is lowest of the 12 countries. Australian consumption has been steadily increasing. Dutch consumption has also been increasing to a level of 144 pounds as a 3-year average. Only Belgium, of the 12 countries, has experienced a substantial decline.

Considerable fluctuations in consumption from one year to another are common and are, of course, attributable to variations in the yield because of weather or other conditions, such as insects or plant diseases. Adjustments in the import or export volume often offset only partly the variations in the domestic supply.

Though per capita consumption of dried fruits has been declining, the consumption of other processed fruits, such as canned and frozen, and particularly juices, has been increasing.

Data compiled by the Organization for Economic Cooperation and Development in Paris for 19 countries (mostly European) show that consumption of fresh fruit has expanded in 14 countries, declined in 4, and did not change in 1.

The committee estimated that more than 11 million tons of fresh fruit were used for juice in 1961, "though the conversions involve a wide margin of error." This tonnage includes the fruits used in the making of citrus, pineapple, grape, apple, pear, prune, peach, apricot, passion fruit, berry, currant, and other juices.

The United States dominates world production and consumption of fruit juices, although it is not possible to be too precise in citing the United States percentage of the total.

Probably more than four-fifths of the world's production and two-thirds of the world's exports are accounted for by United States fruit juices. Citrus juices, of course, the most important juices in the United States, average 550 million gallons of a United States

total of 770 million. More than 80 percent of the Florida orange crop is processed, and two-thirds of the crop is used for frozen concentrate. Pineapple juice is next most important in the United States. Grape juice is third.

Other producing countries, far behind the United States in volume, are West Germany, Switzerland, Italy, and France. Apple, pear, and grape juices are important in those countries. Citrus juices, especially lemon juice, are important in Italy. Production of juices from deciduous and citrus fruits are expected to continue to increase in many countries.

Countries that export juices include Italy, France, the Philippines, the Republic of South Africa, Israel, Trinidad, Spain, Jamaica, and Algeria. Canada, West Germany, and the United Kingdom lead in imports.

It appears that fruit consumption per person will continue to expand in most countries and that total fruit consumption will expand even more since population is increasing.

Although consumption of fresh fruit has been increasing, probably the same tendency will develop in other countries as in the United States—namely, a shift by consumers to processed fruits, particularly canned fruits and juices and frozen fruits and juices.

Both trends—greater consumption of fruit and a shifting toward consumption of fruit in processed form—would mean an increase in international trade.

STANLEY MEHR has been with the Fruit and Vegetable Division of the Foreign Agricultural Service since 1954. Upon receiving his master's degree from the University of Wisconsin in 1941, he joined the Soil Conservation Service and subsequently worked in the Bureau of Agricultural Economics and Office of Foreign Agricultural Relations. He concluded his wartime military service as an agriculturist with military government in Austria. Mr. Mehr has made a number of surveys abroad of fruit production and marketing.

Growing and Using Vegetables

by A. CLINTON COOK

ENOUGH VEGETABLES, including roots, tubers, and melons, are grown to supply an average of 300 pounds for each of the world's 3 billion persons. That would be a total annual harvest of more than 400 million metric tons for food. Besides, starchy root crops, such as potatoes, sweetpotatoes, and cassava, are used in the manufacture of alcohol and starch and are fed to livestock.

Vegetables are nutritious and can supply a large part of one's daily vitamin requirements. A 5-ounce tomato provides one-half the amount of vitamin C and about one-third the vitamin A an adult needs daily.

An acre of tomatoes at a yield of 40 metric tons would supply 700 persons with a medium-sized tomato each day for a year. A yield of 20 metric tons of potatoes would furnish one-half pound daily for a year to 240 persons. (A metric ton is 2,204.6 pounds.) Additional small servings of green and yellow vegetables complete the vitamin requirements. Thus a relatively small acreage of vegetables, reasonably well grown, can provide healthful foods to large numbers.

We eat various parts of vegetable plants—the leaves of cabbage; parts of the flowers of cauliflower and broccoli; the fleshy portion of the roots of carrots, beets, cassava, and sweetpotatoes; and the fruits of tomatoes,