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MARKETING ONIONS [1]

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DEVELOPMENT OF ONION PRODUCTION

The center of onion production seems to be moving slowly westward. Production in the Western and Middle Western States, especially in Colorado, Idaho, Washington, Ohio, and Indiana, has tended to increase, whereas production in New York, Massachusetts, and some of the other older onion sections has remained about stationary or has decreased. The decrease has apparently been caused by substitution of other intensive commercial crops, such as tobacco, celery, and lettuce. The market advantages of the older sections are offset by heavy expense for fertilizers and by greater prevalence of diseases and pests.

From 1918 to 1922 the average annual commercial production of the country was over 17,500,000 bushels, equivalent to about 35,000 carloads of 500 bushels each, from estimated plantings of 60,000 acres. Nearly one-fifth the production, or over 6,600 carloads, was from the three early States, Texas, California, and Louisiana. The

[1] Acknowledgment for material and revision is made to the Divisions of Statistical and Historical Research, Agricultural Finance, Agricultural Cooperation and Cost of Marketing, of the Bureau of Agricultural Economics, and to J. H. Beattie, of the Bureau of Plant Industry.

rest of the crop was from three intermediate-crop States and 16 late States, including the northern districts of California, all recognized as main-crop sections. In average estimated total production the three leading States were California, New York, and Texas, each raising the equivalent of 4,900 to 5,900 carloads. Three States—Ohio, Massachusetts, and Indiana—raised 3,000 to 3,500 carloads. The six States raised about three-fourths of the estimated average commercial crop for the five years 1918 to 1922.

The States do not rank the same in volume of car-lot shipment as in production, because of variation in percentage of the crop used and sold locally or disposed of otherwise than in car lots. Average car-lot shipments for the five seasons 1918 to 1922 show the six leading States in the following order: California, Texas, New York, Massachusetts, Ohio, and Indiana.

Production fluctuates greatly from year to year, but shows no recent definite tendency to increase greatly. It tends rather to alternate heavy and light crops, with lighter crops in the odd years, as in 1919, 1921, and 1923. The relative rank of the States in acreage is nearly the same as in production, but the average yield per acre is generally heavier in the main-crop sections. The industry has shown increasing concentration. In 1900, 10 counties reported 21 per cent of the total commercial acreage; in 1920, 10 counties planted 38 per cent.

For long periods large gains are indicated by census reports of acreage. The total increase in onion acreage from 1909 to 1919 was from 47,600 to 64,300 acres, or 35 per cent. Regarding the growth for the preceding 10 years, the figures are indefinite, but it can be said that production, as reported in 1900, including that for home consumption, was about equal to commercial production in 1910.

COMMERCIAL AND SHIPPING CROP

The proportion of the early crop marketed in car lots varies from three-fifths to nine-tenths of the estimated production. Three years out of five, early shipments equaled about three-fourths of the early crop.

Main-crop shipments seem to bear less relation to reported production. The average proportion shipped is two-thirds. But in 1917 the shipments were less than two-fifths and in 1924 over six-sevenths of the estimated yield. Inaccurate or incomplete reporting is responsible for part of this variation, but onion yields have a way of swinging from high to low and back again, owing to conditions, many of which are beyond human control. The prevalence of high prices in the large cities in short-crop seasons tends to attract supplies that ordinarily would not be shipped in car lots to distant markets.

CLASSES AND TYPES

EARLY AND INTERMEDIATE

Onions are classed according to season of marketing as early or southern (Bermudas and Creoles), and late, main crop, or northern. The Yellow Bermuda (fig. 1) constitutes the greater part of the early southern crop. It is a mild-flavored, rapidly-growing, heavy-crop-

ping variety, adapted for a long season of growth, and is the standard sort in southern Texas and southern California. Unlike the northern type of onion, it is usually transplanted to the field from seed beds and is grown under irrigation. The Crystal Wax and other white varieties of the Bermuda type constitute not over 10 per cent of the early crop. The reddish Creole onion of Louisiana is similar to the Bermuda, and the term "Louisville" is applied commercially to the general mixture of onions grown around Louisville, Ky.

MAIN-CROP VARIETIES

Varieties grown in the main-crop producing sections are adapted to a shorter growing season; they are stronger in flavor and longer keepers. Yellow Globe is a commercial term including several varie-

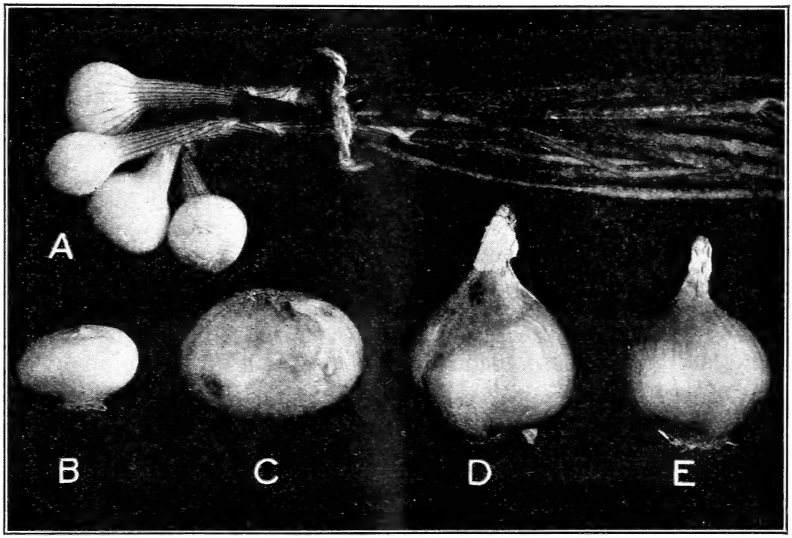

FIG. 1.—Onion types and varieties: A, green bunched onions; B, Crystal White Wax Bermuda; C, Yellow Bermula; D, Egyptian; E, Northern Yellow Globe

ties and strains under that name, also sometimes called the Yellow Globe Danvers, the Southport Yellow Globe, and other local names. The globe type of onion, both yellow and white, grows rapidly, crops heavily, grades and looks well, and is an excellent keeper and shipper. It comprises by far the greater part of the main eastern crop. The Japanese set onion, sometimes called the Ebenezer, is a flat type which is becoming a noteworthy feature in some markets. The sets usually mature earlier than the globe type seed stock, are larger, and bring higher prices. They are usually marketed early in the season. The proportion of red and brown varieties is larger in the West. There is a considerable crop of White Globe onions in Ohio and Indiana. The Australian Brown is popular in California. It is a good storage onion and produces well on heavy soils, but requires a rather long season.

A small and comparatively unimportant part of both the early and the late crops is grown by planting "sets" (onions from one-

fourth to three-fourths inch in diameter, which are small because of extremely heavy seeding) instead of seed, thus obtaining an earlier crop. The production of small onions for sets or for pickling is specialized in a few localities. The "sets" are cured and stored in trays. Under favorable conditions, it requires about four weeks for large sets to produce onions of bunching size, and from 6 to 8 weeks if smaller sets are used.

Onions from three-fourths inch to 1¼ inches in diameter are classed as boilers, and those from one-half to three-fourths inch are known as pickling onions. Onions for pickling are also produced by thick seeding and those below pickling size are screened out and may be sold as sets. The white varieties are preferred for this purpose, the Silverskin being one of the best known kinds.

SPANISH STOCK

Beginning about 1909, an effort was made to introduce the Spanish Denia or Valencia onion, a very large mild-flavored yellow type, in the Southwest. Seed was imported and tried out in many localities. It was found that this could be produced as an early spring crop in many parts of the South and Southwest. They are now grown in southern Texas, New Mexico, Utah, and the San Simon Valley of Arizona, and have been shipped in carload lots from at least one section in southern Texas. The imported Spanish onion matures during the late autumn and comes on the market in midwinter, when its size and bright color are distinct aids in makng sales. The Prizetaker, the chief Americanized Spanish-type onion, is grown in a comparatively small way in the North by starting under glass and transplanting to the field. Egyptian onions, which are discussed further under "Imports" (see page 55) and which compete most actively with the domestic Bermudas, are of the Spanish type.

SEED PRODUCTION

California is the main seed-producing State. About 3,000 acres usually have been grown in the central and southern counties. Selected onions are set in October to February, and the seed matures in July or August. The seed stalks are cut, dried, and run through a threshing machine and a cleaner. The remaining rubbish is removed by immersing in water for a very short time to allow the light chaff to rise to the surface. The seed is then dried carefully. Common yields are 300 to 500 pounds of seed to the acre.

COMMERCIAL ONION REGIONS

Most of the commercial onion regions are small and the production is highly specialized. Half of the commercial shipped crop is grown on 25,000 acres. The long distance over which 40 per cent of the commercial onions are shipped indicates not only the excellence of the transportation facilities, but also the ability of this somewhat perishable crop to pay a very high transportation charge, taking one season with another. The census showed some acreage of commercial onions in every State in 1919, running from 14 acres in Nevada

to 8,512 acres in California. On the other hand, about 80 per cent of the shipped crop comes from six States.

California led in commercial acreage in the census year with 8,512 acres, or one-eighth of the total. New York followed with 7,500 acres, Texas had 6,253, Ohio 5,713, Illinois 4,499, and Massachusetts 4,411. More than half the onion acreage was in the East North Central, Middle Atlantic, and New England States, but the acreage grown per farm is larger in the West than in the East. Average value of the crop per acre was highest in New England ($495), and lowest in the East South Central States ($202), compared with the average for the United States of $332.

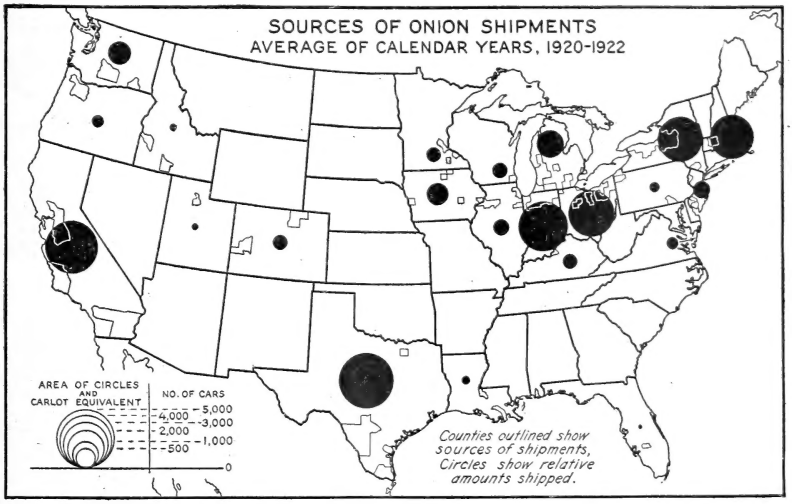

FIG. 2.—Commercial production of onions is mainly in shipping regions of nearly equal importance in the West, South, Middle West, and Northeast

The United States Department of Agriculture reports onion shipments from 39 States during the five years 1918 to 1922, but the quantity shipped from many of these is small in proportion to the estimated production of the State. Probably nearly one-third of the commercial onion crop is sold locally in less than carload lots.

The principal onion shipping sections are shown in Figure 2. Counties outlined averaged annual shipments of 50 cars or more for the three years 1920 to 1922. The circles indicate average shipments from individual States.

HOW PRODUCED

The well-known commercial onion districts are mostly of rich, level, clean valley soils or drained muck land, often with a medium loam, deep and easily worked. Fresh seed of the best stock is important. A liberal use of fertilizer, thorough tillage, and clean culture are among the general features in production of the northern crop. Machine planters and wheel hoes are used, but some hand weeding is necessary.

Domestic Bermuda onions are grown mostly from seed imported from the Canary Islands. The crop is started in seed beds and transplanted to the fields two months later. Irrigation water is applied between the rows or by flooding (fig. 3). Frequent shallow cultivation is practiced and hand weeding at intervals. Details of cultural treatment may be found in publications listed at the end of this bulletin.

EARLY-CROP SECTIONS

Texas.—The greatest early-producing State is Texas (Table 1), averaging around 4,900 cars a year. These come mostly from eight counties in the southern part of the State, fully one-half from Webb and Dimmit Counties. Beginning in Cotulla, La Salle County, about 25 years ago, the onion industry quickly spread to the Laredo section in Webb County and was soon taken up in Dimmit, Zavalla,

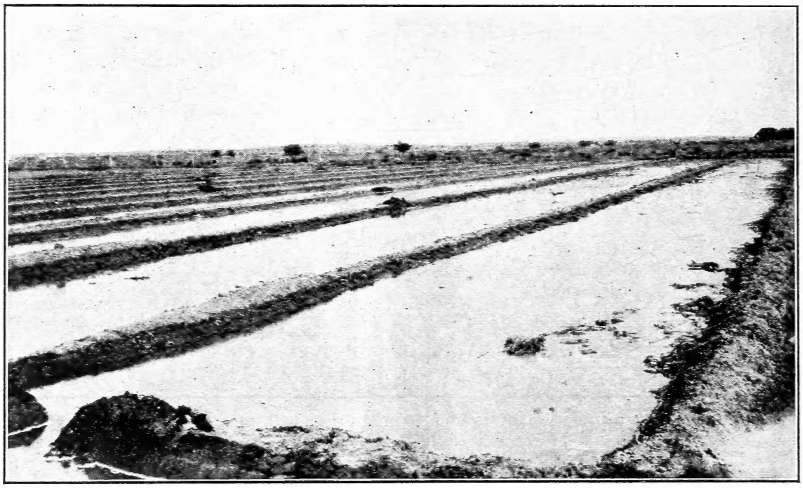

FIG. 3.—Texas onion field irrigated by flooding

Hidalgo, Frio, Maverick, Atascosa, Nueces, and other counties. Of these, five counties—Webb, Dimmit, Zavalla, Frio, and La Salle—usually include about three-fourths of the State's total acreage. A considerable crop of White Globes and Spanish-type onions is now grown in the Collin County section, from which about 130 cars are shipped annually. As a rule it has been found difficult to market much over 4,500 carloads from the State as a whole and the occasional attempts at sudden expansion have resulted unprofitably. Two principal varieties are raised—Yellow Bermuda and Crystal Wax. The Crystal Wax onions constitute only a small fraction of the total crop, but in general command somewhat higher prices.

California.—The California Bermuda season follows that from Texas, but the crop is only about one-fourth in quantity. Production of Bermuda-type onions, which constitutes about one-fifth the State's total, centers in the Coachella Valley in Riverside County. This valley is part of a large basin, the desert remains of a

vast inland sea, and the portions that have been placed under irrigation are all below sea level. Ordinarily one-third to one-half of the State's early shipments come from Coachella. Of these, about 80 per cent are Yellow Bermuda and the remainder are Crystal Wax. Harvesting is begun about April 1 and continues through May.

California Bermudas in midwestern markets compete sharply with those from Texas during the latter part of the Texas season. In most cases competitive strength seems to turn on the quality of the season's crop and the methods and care used in grading. Both crops are raised under irrigation, but the weather has a great influence on size and marketable condition. The California crop must pay a higher average freight rate.

Louisiana.—The onion crop of Louisiana is approximately 90 per cent Creoles and the remainder Bermudas. Quality varies greatly, because there are many growers each of whom produces a small lot. Frequently heavy rains at digging time injure most or a considerable part of the crop. The usual quantity of Louisiana onions shipped from New Orleans is locally estimated at from 350 to 500 cars, including large quantities forwarded in small lots and in mixed carlots. The season runs approximately from May 10 to June 10, but local dealers often hold a part of the stock as late as July 10.

REPRESENTATIVE MAIN-CROP SECTIONS

The northern or main crop is raised in a few rather well-defined areas, mostly in a dozen States, from California, Idaho, and Washington eastward to New York and Massachusetts. Only eight of the main-crop States report annual shipments of more than 500 cars. California ships onions every month in the year, but the late crop, produced in the vicinity of Fresno and Sacramento, is usually three or four times as large as the early crop of Riverside and Imperial Counties.

California.—The heaviest western production of the late-crop onions centers in the low lying, almost swamp islands in the delta region of California at the junction of the Sacramento and San Joaquin Rivers. San Joaquin is the greatest of all onion-producing counties, raising over 5,000 acres yearly. From its chief shipping point, Stockton, approximately 1,500 cars were forwarded annually in 1921 and 1922. Scattered acreages are found throughout the central part of the State. In contrast to the desert conditions of the Bermuda-onion district, the late-producing areas are chiefly islands, protected by huge dikes, that range from a few hundred to several thousand acres in area. Waterways take the place of roads. Communication is largely by fast motor boats, and hauling to the railroads is accomplished with barges and steamboats. Harvesting begins about the middle of May for the earliest varieties and continues until the middle of November. The most common varieties grown, in order of importance, are: Australian Brown, White Globe, Yellow Danvers, and an early red variety of a flat type commonly called Red Spanish.

Massachusetts.—In 1919 the Connecticut Valley onion crop in Hampshire and Franklin Counties, as shown by the census returns, attained a farm value of over $500 per acre, all raised on a very

small area of sandy loam bordering the Connecticut River, like the fields shown in Figure 4. South Deerfield is the largest shipping point, followed by Hadley and Hatfield. Yields range from 300 to 600 bushels per acre, with great variations, not only on account of season but on account of the prevalence of disease in one section or another. The leading variety is the Yellow Danvers, and there is a small acreage of Red Wethersfield and of the White Globe. A small part of the production is grown from sets and harvested in July. The principal crop is raised from seed and harvested from August to October. Many of the growers are of Polish descent who have

FIG. 4.—Harvesting Connecticut Valley onions

immigrated to the valley since 1890. They devote most of their attention to small lots of onions or to high-grade tobacco, both highly specialized crops, requiring much labor in their production.

Western New York.—In production and shipment of northern onions New York is often the leading State. Production is chiefly in two widely separated districts, known commercially as Western New York and Orange County. The Western New York district consists of a double row of counties along the southern shore of Lake Ontario, from Niagara, at the State's western boundary, to Oswego and Madison Counties, near the center of the State. Of this area, Wayne was the heaviest shipping county in 1921 and 1922, fol-

lowed by Madison, Genesee, Orleans, and Oswego. The most important shipping stations are Canastota, in Madison County, Elba, in Genesee, and Williamson and East Williamson, in Wayne County.

The Yellow Globe is the leading variety in Western New York, with a small percentage of the Red Globe. The crop in general is well grown, maturing a large proportion of first-class stock. The greater part of the commercial product not shipped early in the season is placed in bushel storage crates and held for a time in barns, warehouses, or commercial storage buildings. The active shipping season continues from August to February. After that month the volume of movement decreases rapidly, the condition of the stock is not so good, and there is increasing competition with southern onions.

Orange County, N. Y.—A rather distinct producing region in Orange County, 50 miles northwest of New York City, produces about one-third of the onions grown in New York State. Production centers largely around Orange Farm, Big Island, Pine Island, and Florida. In 1923 the estimated acreage was 3,550, which was about equal to the average plantings of the three previous years. Most of the onions are grown from seed, although there has been a tendency in recent years to increase the planting of sets, because of their earlier maturity. The chief variety grown is the Yellow Danvers, but the red kinds are also rather generally produced. The movement to market usually starts about July 20, and is heaviest about September 1. The crop enters the consuming centers a short time in advance of Connecticut Valley onions.

New Jersey.—Production of onions in New Jersey centers in Cumberland County around Cedarville and Newport. Shipments from this section averaged about 550 cars for the five seasons 1918–19 to 1922–23, and were chiefly of onions grown from sets. Competition with foreign onions is keen in some seasons and poor yields also have been somewhat discouraging in recent years. The greater part of the crop is marketed during July and August and is packed in bushel hampers.

Indiana.—Onions are grown extensively in the muck soils of northern Indiana in Whitley, Noble, Starke, Jasper, Dekalb, and other counties. Among the important shipping stations during 1921 and 1922 were McCoysburg, Kimmell, Churubusco, Collins, Columbia City, and Knox. Whitley, the leading onion county, harvested in 1923 approximately 1,300 acres out of a total of 5,900 estimated for the State. In Whitley County, production centers largely around Churubusco and Collins, in isolated patches of swamp muck land. Many of these patches are found around the Blue River, within a radius of 15 miles of Churubusco. The shipping season usually begins about July 15 with the heaviest movement in September and October. Approximately half the acreage is grown on shares.

Ohio.—Onion production in Ohio is most prominent in Hardin County, with Alger and McGuffey as main shipping points. The principal onion district is the Scioto marsh—a tract of reclaimed land approximately 6 miles square lying along both banks of the Scioto River. The entire marsh contains approximately 20,000 acres, nearly one-fifth of which is in onions. The black muck soil requires but light applications of fertilizer, and yields in a normal year average around 400 bushels per acre.

Chief varieties are the Yellow Globe, Southport White Globe, and Red Globe. Production is largely from seed. Very few are grown from sets. The shipping season varies somewhat from year to year, but usually begins about July 15, with the heaviest movement in September and October. The crop goes on the market in competition with the other principal main-crop sections.

Michigan.—Onions are grown extensively on the fertile muck lands in southwestern Michigan, with its cool planting and growing season and a dry, moderately warm late summer. Total car-lot shipments from the State averaged nearly 800 cars for the five seasons 1918–19 to 1922–23. This average was affected considerably by the very large crop of 1922, when 1,867 cars were reported shipped to the end of the season. On the other hand, in 1919–20 only 224 cars were shipped from the State. Figures for each of the five seasons mentioned are shown in Table 13. Leading shipping counties were Allegan, Barry, Kent, Van Buren, and Ottawa. Doster, in Barry County, was the heaviest shipping point, averaging over 200 cars per season from 1920 to 1924. Decatur, in Van Buren County, was next, followed by Martin, in Allegan County, and Byron Center, in Kent. The favorite variety in Michigan is the Southport Yellow Globe, but the Southport Red Globe is also extensively grown, being productive and a good storage type.

Iowa.—Onions are grown commercially in Iowa principally in three counties: Mitchell and Cerro Gordo in the extreme north, with St. Ansgar and Clear Lake as forwarding points; and Scott County in the east along the Mississippi, shipping from 200 to 300 cars annually, mostly from Pleasant Valley. Production for the State averages 300,000 to 600,000 bushels and acreage ranges from 1,200 to 1,600.

Minnesota.—The State of Minnesota raises about 1,500 acres of main-crop onions, producing annually from 300,000 to 500,000 bushels. The principal onion section centers around Minneapolis and extends for some distance northwest and southeast along the Mississippi River. Wabasha is the leading county in volume of carlot shipments. Plainview is the State's heaviest shipping point, from which 50 to 150 cars are forwarded annually. Dakota and Hennepin Counties follow in order, with Mendota and Minneapolis, respectively, as chief shipping stations. Dodge Center in Dodge County forwards about 50 cars each year.

Kentucky.—A few hundred cars of mid-season onions are shipped annually from the Kentucky district, centering at Louisville. The principal shipping stations besides Louisville proper are St. Matthews and Buechel, which are suburbs of Louisville, and O'Bannon, Lyndon, and Crestwood. The bulk of the shipments from this section consists of a local variety that is halfway between the flat and round types, and of varying shades of brownish to yellowish red, known to the trade as Louisville stock, locally sometimes called the Strassburg. Harvesting begins about the middle of June. Shipments are widely distributed, for Louisville is centrally located, with practically uniform freight rates to many large markets in all directions, and occupies a rather unique position as a shipping center.

Colorado.—Heaviest onion-shipping counties in Colorado are Montrose, Delta, Weld, and Adams, which had 95 per cent of the

onion area in 1923. Considerable quantities are shipped out of South Platte Valley, in the section from Denver to Greeley. Total production gained steadily from 258,000 bushels in 1920 to 590,000 in 1923 and to over a million in 1924. Shipments are partly in straight car lots, but chiefly in cars of mixed vegetables. Colorado shipped over 1,000 carloads of onions in 1924–25, compared with about 900 the season before and 200 to 600 in previous years.

Idaho.—Onions are produced commercially under irrigation in Idaho, in the vicinity of Filer, Buhl, Twin Falls, Rupert, Boise, Caldwell, and other towns. The leading variety is the Yellow Danvers. Yields exceeding 800 bushels per acre are sometimes reported on irrigated land, and the State has often led all others in average estimated yield per acre. The crop matures from late August to the last of October. It is usually sorted and sacked in the field and shipped at once. Very few onions are stored.

Washington.—The district around Walla Walla is the principal onion section in Washington, with reported shipments over 1,000 carloads in 1924–25. The onions grown here are reputed locally to have originated from Spanish stock. They are sometimes termed French onions or Washington Yellow Globe, but since only one kind is raised in the immediate vicinity of Walla Walla they are called commercially Walla Walla Yellow Globe. They are usually planted in the fall and thinned out in the spring for green onions. The rest of the crop, when grown, is pulled while the tops are still green. After cutting the tops they are allowed to remain in the field a few hours to dry. They are then packed without curing.

Oregon.—The most important onion section in Oregon is in the Tualatin Valley, about 15 miles west of Portland on "beaver dam" land, some of which has been used for onions for 50 years. About 400 acres are planted and the normal yield is about 500 bushels per acre. The onions are of a special type called the Oregon Danvers, which seems to have been produced by selection from Yellow Danvers, crossed with the Australian Brown. The result is a firm, long-keeping onion, somewhat globular in shape, which is sometimes seen in market in good condition as late as August. The growers harvest in September and October, cure the stock for several weeks in the field, store under cover on the farm, and sort and grade the onions when needed for market during the winter.

HARVESTING, GRADING, AND PACKING

BERMUDA ONIONS

Domestic Bermuda onions are harvested when most of the tops have fallen (fig. 5), although there has been a tendency to harvest unripe stock in order to obtain high prices on the early market. Immature onions are spongy and of poor appearance and carrying quality. The onions are lifted with a light plow, and 10 to 14 rows are thrown together in a windrow. They are left to dry from 12 to 48 hours and are then clipped with sheep shears. In southern California the roots are cut before pulling, by knives attached to a horse-drawn sled. Texas and California Bermudas are often sorted and crated in the field (fig. 6).

The United States grades for domestic Bermuda onions have been adopted officially by both Texas and California; but, as a matter of fact, prior to the 1924 season most of the crop has been shipped as "commercial grade," which includes all stock of U. S. No. 2 quality

FIG. 5.—Onion field, Laredo, Tex. The falling over of the tops is a sign of harvest maturity

or better. During the 1924 season, however, the shipping-point inspection service was inaugurated by the United States Department of Agriculture in cooperation with the Texas State Department of Agriculture, and a large part of the crop was graded and inspected

FIG. 6.—Sorting and crating are done in the field (Texas)

on the basis of the United States grades. In California the United States grades have been used extensively in connection with the shipping-point inspection service conducted by the Federal department and the California State Department of Agriculture since 1921.

U. S. No. 1 Bermuda onions, according to the United States grades as revised March 17, 1924, consist of Bermuda onions of one variety which are mature, well shaped, free from doubles, splits, bottle necks, seed stems and noticeably pink onions, and from damage caused by dirt or other foreign matter, moisture, sunburn, sunscald, cuts,

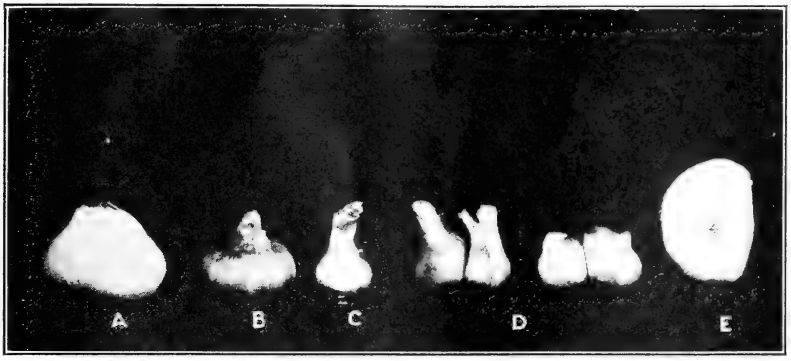

FIG. 7.—Bermudas of poor types should be thrown out. A, "split"; B, a pinked yellow; C, a bottle neck; D, two bad doubles; E, half of a double

disease, insects, or mechanical or other means. U. S. No. 2 Bermuda onions shall consist of onions of one variety which are free from bottle necks, seed stems, and splits and from damage caused by moisture, sunscald, cuts, disease, insects, or mechanical or other means. U. S. No. 2 Yellow Bermudas may not contain more than 15

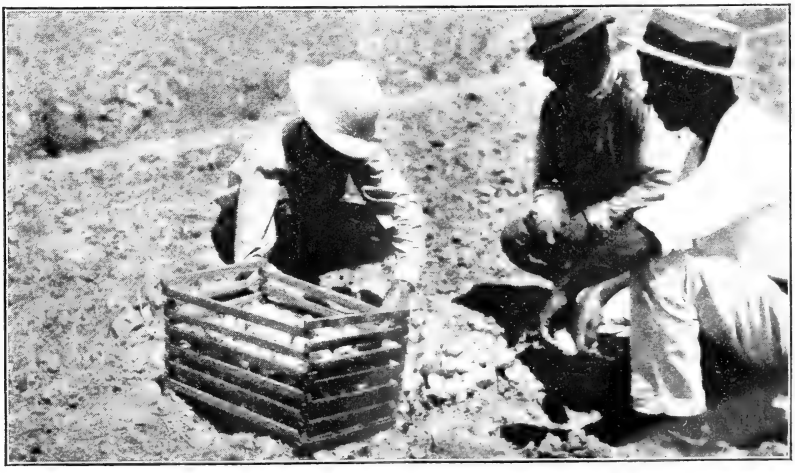

FIG. 8.—Field inspectors insist upon careful sorting

per cent by weight of noticeably pink onions. U. S. No. 3 grade includes all onions which do not meet the foregoing specifications.[2] In Figure 7 some types of Bermudas which should be culled out are shown. Figure 8 shows field inspection of crated Bermudas.

[2] Copies of the United States grades for northern-grown and Bermuda onions may be secured without charge on application to the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Domestic Bermuda stock is mostly marketed in slatted crates which have a capacity of about one bushel. Some difference in net weight may be anticipated from such causes as variation in size or maturity of stock, although most differences come through failure to fill the crates properly. Sacks are sometimes used for well-cured stock, but the crate is more popular on the market, as it affords ventilation and permits inspection without disturbing the package.

LATE ONIONS

Methods of harvesting and grading are fairly uniform throughout the late-crop sections. When the tops begin to turn yellow in the fall, the onions are pulled and placed in windrows (fig. 9). To hasten maturity, some growers break down the tops with a plank drag or by rolling them with a barrel. Usually three rows are pulled

FIG. 9.—Harvesting a large crop in an eastern field which is equipped for overhead irrigation. The onions are left in windrows to dry out

at a time from each side of the windrow, the bulbs are placed in the middle and are partly covered by the tops. They are left to cure from one or two days to two weeks, depending upon the locality and weather conditions. White varieties become green and discolored upon exposure in the field, and are usually cured in crates or trays in sheds.

After curing, the tops are cut with sheep shears to about one-half to one inch in length, after which the onions are placed in slatted field crates holding about a bushel, or in sacks holding about 100 pounds (fig. 10). In some districts growers use topping machines with capacities that range from a few hundred to several thousand bushels per day. When topped by machines the onions are only partially field cured, but are usually forked into crates and hauled to the curing shed or barn before being topped. In some cases topping

is done in the field, after which the crates are tilted or stacked to permit ventilation, and left to cure for a few days longer before hauling.

Grading is done over inclined screens or slatted racks, the usual practice being to separate the stock 1¼ inches and larger from the smaller sizes. Loose tops and dirt also pass through the screens. In Orange County, N. Y., grading is not so close. A three-fourths to one inch screen is employed, with the result that nothing but the very small "picklers," tops, and other foreign material are removed. Standard grades for northern-grown onions are just coming into general use. The United States grades are the only widely-recognized standard, but as their use is wholly optional, growers in general do not comply strictly with their specifications. During the season of 1923 the grades were used in connection with the joint inspection service offered at shipping points by the United States Department of Agri-

FIG. 10.—Harvesting California onions

culture and the several State departments of agriculture. Official inspections have been made on the basis of the United States grades in New York, Massachusetts, Ohio, Indiana, Colorado, Utah, California, and Washington.

The U. S. No. 1 grade for northern-grown onions, as revised in 1924, includes all lots of similar varietal characteristics which are firm, mature, free from doubles, splits, bottle necks, scallions, dirt, tops, or other foreign matter and from damage caused by sprouting, freezing, disease, insects, or mechanical or other means. Unless otherwise specified, the minimum size shall be 1½ inches in diameter Onions may be classified for size on the following basis:

BOILERS	SMALL	MEDIUM	LARGE
¾ to 1½ inches	1½ to 1¾ inches	1¾ to 2¼ inches	over 2¼ inches

The United States grades for northern-grown onions apply to all varieties except Bermudas, Creoles, and Denias.[3] No standards are recognized for the last two types.

[3] See footnote 2.

Northern-grown onions are usually marketed in open-weave paper-fiber or burlap sacks containing 100 pounds. The paper sacks permit good ventilation and show well-graded stock to advantage on the market. Some homegrown northern stock is graded in the field and put in hampers, which are convenient and satisfactory for the short-distance haul early in the season. (See fig. 11.)

FINANCING THE CROP

Money for producing and handling the onion crop is obtained under three prevailing plans: (1) By means of cash or credit supplied by dealers in return for control of the crop; (2) by means of loans or credit without contracting the crop; (3) by growing the crop on shares. The method described below as prevailing in Texas and California applies rather generally to the early crop. The

FIG. 11.—Considerable "home-grown" stock is field graded, put up in hampers and trucked to market

methods prevailing in the Connecticut Valley of Massachusetts, in Orange County, N. Y., and in the Middle West are typical of the whole late-crop region. The chief difference between the various northern sections is the greater prevalence of share tenancy or crop sharing in sections where many of the growers are of foreign descent. Northern farm owners who are growers and who need outside funds depend chiefly on banks, although fertilizer dealers extend credit in most sections and store credit is frequently used in purchasing general supplies.

TEXAS AND CALIFORNIA

Certain onion growers in Texas and California are wholly or partially financed by dealers or commission merchants in the terminal markets. The Texas grower in some localities may receive from

these dealers, between October and March, cash and fertilizer advances of approximately $40 per acre. The grower in return agrees to market his onions through the dealer for either a fixed marketing charge per crate, or a commission which usually amounts to about 10 per cent of the total sales.

In southern California many of the individual acreages are small and the growers finance themselves. Some shippers make crop advances and take as security a first mortgage on the crop or sale contract. In some cases the shipper leases the land from the grower and employs him to produce the onions on a straight contract, the actual ownership of the onions in this case being vested in the shipper. Large growers are often financed by the shipper in return for the exclusive marketing privilege. Still others do not finance the growing of the crop but furnish the grower with cash advances for harvesting expenses, to be repaid out of the proceeds of the crop. In the delta region the growers either finance themselves or produce the crop with a cash advance on contract or on a crop-sharing plan with the shipper or distributor.

CONNECTICUT VALLEY

The production of onions in the Connecticut Valley is financed largely by the landowner and his tenant under the crop-sharing plan, supplemented by liberal credit from the fertilizer companies. By this arrangement the landlord supplies the land, the fertilizer, frequently half the seed, and prepares the soil for seeding. The tenant supplies all the other labor and either half or all the seed, depending on his agreement. The crop is equally divided between them at harvest.

Some credit is also extended by the local banks, merchants, and seed dealers. Bank loans to pay for labor and fertilizer are made chiefly to the large growers. They are made almost solely on personal security, usually for a term of six months, interest at 6 per cent, payable in advance. Approximately three-fourths of the fertilizer used is bought on credit without interest. Sales are made on open account, are unsecured, and call for payment about December 1. Liberal cash discounts are allowed for payment prior to July 1. Seed is advanced on credit by the local merchants who act as agents for the seed companies. Dealers do not advance money for production or marketing.

Local dealers maintain large and well-constructed storage houses and ship the onions in accordance with market demand. In addition, they rent storage space to growers on reasonable terms, thereby giving to all growers ample opportunity for holding and marketing their crops, provided they can finance the storage. Bank loans to enable growers or dealers to store onions are based on the resources and financial standing of the individual and not on the onions as collateral.

ORANGE COUNTY, N. Y.

In Orange County, N. Y., much the same conditions prevail as in the Connecticut Valley. Bank loans to growers are used cheifly for living expenses and to pay labor.

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About two-thirds of the fertilizer is bought on credit. Sales are made on open account, are unsecured, and call for payment about September 1. Liberal cash discounts are allowed for payment before July 1. Credit for seed and some food supplies is advanced by the local supply merchants.

HARDIN COUNTY, OHIO

Approximately three-fourths of the crop in the well-known onion section of Hardin County, Ohio, is grown on share-crop agreements. The landowner usually furnishes the fertilizer and seed and prepares the ground and the tenant does all the remaining work. In some cases the tenant furnishes a portion of the fertilizer and seed. The crop is equally divided between the landowner and the tenant. Bank loans are made rather frequently to the larger growers who are considered good credit risks. Frequently, a landowner indorses a note for his tenant. Conditions under which bank loans are made and credit for fertilizer is obtained differ little from those in sections already described. Since almost all the large growers are also dealers, their resources and credit facilities are usually sufficient to finance the marketing of the crop independently.

LOCAL SALES METHODS

A very large proportion of all onions go from the field at once into the hands of local buyers or local agents of city dealers or are consigned to commission men in the central markets. This is true both of early and of late onions.

THE EARLY CROP [4]

Early southern onions are on the market only a very short time and must be handled through some system that moves them quickly and gets them into the hands of the consumer within a few days after reaching the terminal market. In most instances the first shipments of onions bring much higher prices than those that are shipped a few days later. For this reason there is an attempt by both farmers and shippers to place their onions on the market as soon as possible after they are ready to ship.

The farmer who raises early southern onions in Texas and California usually sells for cash to a local buyer at harvest time as the cars are loaded. Some growers contract to sell to a buyer before planting time, or before harvest, at a specified price or for the privilege of marketing the crop. Comparatively few farmers themselves ship onions on consignment, although consignment shipments by local dealers are in some years the most prevalent form of sale.

The local buyer or shipper of early onions is likely to be an agent of some commission firm or onion dealer in the large central markets, to whom he forwards his purchases as quickly as possible after they have been delivered at the local station. He may, however,

[4] A more detailed discussion of financing of the early crop will be found in Department Bulletin 1283, United States Department of Agriculture, "The Marketing and Distribution of American-Grown Bermuda Onions."

be an independent buyer who ships to commission men or who sells outright on what are called f. o. b. orders. These orders or offers for carloads of onions usually come to him by wire, and the cars are sent on to the city buyer, who has the privilege of inspecting them before paying for them. Frequently early in the season, when the market is falling rapidly, shipments are made by express rather than by freight in the endeavor to reach the central market and sell at the higher price. Methods of purchase and sale vary greatly from year to year and depend on the character of the crop, competition on the market, and the conditions of transportation.

Some difficult problems arise in marketing the early crop, because the quality is variable, the product deteriorates rapidly, and storage is not possible. Methods of grading and inspection are still frequently unsatisfactory. Another problem is that of car supply, which is further discussed on page 25. Considering the very long shipping distances, the wide distribution of this early crop is amazing.

Until about 5 or 10 years ago the bulk of the Louisiana onion crop was consigned to New Orleans dealers. Since that time only about 10 per cent is consigned; the remainder is sold f. o. b., usually before digging. This stock is put up in sacks averaging 100 pounds. A considerable portion of the crop is handled by cooperative associations, and these onions are, as a rule, put up in new sacks and are fairly well graded; but the several New Orleans jobbers, who usually ship north, re-sort much stock before loading. No attempt is made to meet any grade requirements; only the very small onions and very bad doubles and bottle necks are thrown out.

THE LATE CROP

The late onion crop is marketed through regular dealers and is on a somewhat more stable basis than the early crop. The best of the onions can be stored for some time, grades have become fairly well established, there is usually no great haste in rushing the onions from the field to the market, and the distances shipped are not nearly so great as is the case with early onions. Exception must be made in the case of shipments of late onions from California, which appear on the market throughout the year, but even these late onions are more easily shipped than the early crop of Texas or the Coachella Valley.

Few growers in the western New York section attempt to market their own crops. They grade the stock and sell it to the dealer by the bushel at the car door or loading point, letting him effect the sale to city dealers with or without holding in storage. The dealer sells on the 100-pound basis, f. o. b. usual terms. A few large growers load their own cars and sell on the local track or consign to city dealers.

In Orange County, N. Y., growers generally sell most of their crop in the field at harvest time to local buyers. The balance is consigned, stored, or taken by truck to New York City and vicinity, where it is sold to jobbers or wholesale and retail grocers. Most of the local dealers, who usually are also growers, sell to city commission firms on a joint account basis, although some cars are consigned.

In Ohio shipping sections, onions are sold in bulk by the bushel and delivered by the growers to the dealers' warehouses. The dealers sort and grade the stock. The onions are then crated and stored until the dealer sells them, when they are again resorted and sacked. There are practically no buyers on the ground except the local dealers. A few of the growers have their own warehouses, but most growers are obliged to sell soon after harvesting.

Conditions are very uniform in the onion-shipping districts of Indiana and other midwestern sections. About 75 per cent of the crop is sold in the field to local dealers at harvest time. Occasionally a grower consigns a car. Most dealers' sales are made on orders received by telegraph, but there are some consignments and some joint-account sales in which two dealers jointly furnish capital for buying and share the profit or loss. Many of the local dealers in these sections are representatives of large city concerns.

Onions in the delta region of California are mostly sold by the sack for cash along the river bank. Crops grown on contract or on the crop-sharing plan are sold by the contractor and shipper for the account of the grower.

The Connecticut Valley crop is sold chiefly to large local dealers, who may either ship or store their purchases, according to market conditions and outlook. There are a very few traveling buyers who purchase direct from the grower. Dealers usually make sales f. o. b. usual terms, except when the city buyer is present, when the terms are cash track. Since most of the sales are made to firms who have no local buyers or are made late in the season after the buyers have left, f. o. b. usual terms is the prevailing basis of sale in this district.

Onions grown in Kentucky are brought in barrels by the growers to the packing sheds of the local dealer and payment is made on the barrel basis.

COOPERATIVE MARKETING

Reports received by the Department of Agriculture indicate that seven associations handled onions in 1922 and shipped 974 cars valued at $464,826. Of the seven, only two handled onions exclusively, four handled other vegetables also, and one association handled both fruits and vegetables. One association was located in each of the following States: Oregon, Texas, California, Minnesota, Michigan, Washington, and Virginia. One of these associations was organized in 1906, one in 1907, two in 1916, two in 1919, and one in 1922. All of these associations were of a local or regional character.

In July, 1922, under the guidance of the Texas Farm Bureau Federation, the Texas Farm Bureau Onion Growers' Exchange was formed. This organization is a federation of seven local associations, with headquarters at San Antonio. The exchange handles the sales of the locals, buys supplies for the grower members, and assists the growers in financing the growing and harvesting of the crop. From reports received by the department, this association reported, in 1923, sales of 944 cars of onions valued at $646,715.

A second large federation was formed in the summer of 1923, under the guidance of the Indiana Farm Bureau Federation. It is known as the Indiana Farm Bureau Onion Growers' Exchange, and main-

tains an office at Warsaw. At present, it is made up of 12 county organizations. Its membership in 1923 was 321, which, according to officials of the association, is about 60 per cent of the onion growers in Indiana. From reports received to date, this association marketed 596 cars of onions in 1923, valued at $300,000. These onions were sold in 88 markets in 25 States. This is in contrast with 1922, when 2,148 cars of Indiana onions were sold in nine large markets. The association therefore has succeeded in making a wider distribution of the crop than had previously been made by outside agencies.

Properly managed, cooperative marketing organizations afford economies in assembling the product and improvements in grading and packing, but the small tonnage which they control and their limited marketing connections do not always permit them to distribute their shipments systematically. The merits of the larger or federation type of organization are being considered in the hope that, through large volume, better distribution, and improved market connections, the market may be stabilized and fairer returns secured to growers.

STORAGE

Most onions are placed in storage during October. By the end of November shipments from the field and from temporary storage have ceased and shipments thereafter are almost entirely of storage onions. Approximately 50 to 70 per cent of the commercial onions are shipped directly from the harvest field or from temporary storages. The remainder is placed in permanent storage in producing regions and is moved throughout the winter.

Rather careful surveys show that very few of these country storage onions remain in the farmer's hands. Nearly all of them have passed into the possession of local onion dealers, who may well be called speculators. The storage of onions is expensive. The mere possession and holding of the onions must be financed and the waste from storage even under the best conditions is considerable. Shrinkage is seldom less than 7 per cent in any year, although it rarely exceeds 15 per cent, except for onions that are held very late the following spring. There are some seasons, however, when the quantity of storable onions is comparatively small and the quality poor, and occasionally the shrinkage loss has been as high as 33 per cent.

Long-period storage of onions in producing sections is important in New York, the Connecticut Valley, the Middle West, and in central California. Early onions are not storable for any appreciable time, and the so-called intermediate crop is shipped within a few days after harvest. Moreover, in Ohio and Indiana commercial storage has been developed to only a moderate extent, so that during the fall of 1922, when much of the eastern crop was of low grade, many cars of onions were shipped from Ohio and Indiana to the Connecticut Valley and there placed in storage, shippers availing themselves of the "storage in transit" privileges granted by the railroads. The greater part of the locally-stored onions is kept on the farm in sheds or other buildings until hard freezing weather, usually about December 1. At that time they are either transferred to the warehouse of the local dealer or, if they have not been sold

to a dealer, the grower himself ships them to market or transfers them to commercial storage.

Comparatively few permanent onion storages are found on farms. A survey of the Connecticut Valley a few years ago revealed a total permanent farm-storage capacity for 35,000 bushels of onions, and in nearly every instance the farmer having permanent storage found it necessary to obtain additional onions to fill his warehouse. The estimated farm-storage capacity of the Connecticut Valley, including both temporary and permanent warehouses, is about 250,000 bushels.

Commercial storage in the eastern onion-growing sections is somewhat more important than farm storage. Probably it has been developed to its greatest extent in the Connecticut Valley, where there are 20 or more commercial warehouses with a total capacity of approximately 350,000 bushels. For this valley the total possible storage up to December 1 is something like 600,000 bushels.

In producing sections of Ohio, Indiana, and Illinois many of the local dealers are representatives of large city concerns which own storage houses. Frequently these buildings have a capacity of 75 carloads, and stock is often stored in bushel crates just as it is purchased from the growers. Most of the onions stored in these districts are owned by such dealers, but storage space is sometimes rented by the crate. Few midwestern farmers have facilities for storing their own onions throughout the season. In California the storage stock is held in well-ventilated but weather-proof sheds or barns. Under favorable conditions it may be kept from October until March.

Onions are usually stored in slatted 2-bushel crates which permit ventilation and so retard deterioration. (Fig. 12.) Since crates are relatively costly, some storages are provided with bins about 8 feet wide by 15 feet deep fitted with portable shelves upon which the onions are spread from 6 to 8 inches deep. This allows circulation of air above and below the shelves and is fairly satisfactory, though there is greater loss by heating in this method of storage. A few onions are stored in sacks, which are placed on shelves in such a manner as to permit free circulation of air. Dealers agree that as a rule shrinkage is greater from storage in bags and that the onions discolor the bags, making them unsuitable for shipping.

Commercial storages in Western New York are equipped with numerous windows to allow for free circulation of air, and are so built that they may be kept very dry. The onions are stored in the field crates in which they are cured. It is important to keep the onions dry and cool and the buildings frost proof.

Comparatively few onions are kept in cold storage, and the greater portion of these only after January 1, at terminal markets. Onions will keep in prime condition in common storage until that time if conditions of harvesting and storage are favorable, and to save cold-storage charges most dealers wait until the first of the year before transferring stock. On account of their odor, onions present a problem when stored with other food products.

One of the important problems of storage is to obtain a sufficient supply of storable onions. Out of a crop of late onions sometimes only 30 to 35 per cent is dependable storage stock. In other years

the percentage is much higher. Another problem is that of taking care of the onions while in storage to prevent overheating and the development of disease. The labor costs of storing onions, sorting, grading, and removing them from storage are considerable. Taking one year with another, very few farmers have found it advantageous to store onions either in their own warehouses or in commercial storages. There is no doubt, however, that in some years storage has been very profitable.

It is difficult to reckon the total cost of storage, including shrinkage, handling, and insurance. In 1914 it was estimated at from 30 to 40 cents per 100 pounds. The cost is probably twice that at the present time. Even 1 cent a pound does not seem an exorbitant price

FIG. 12.—Interior of onion-storage house

for the consumer to pay for the storage of his onions, although it is possible that more than this is added by storage to the retail price.

The element of price risk in stored onions is great, however, and numerous dealers have lost heavily in their failure to guess correctly the trend of the market. To offset this, some of them have found the storage of onions very profitable in years when a late or short spring crop followed upon a comparatively short main crop. Taking one year with another, it is apparent that the risks and losses of winter storage are such that only a large operator or a grower with unusual financial resources should undertake them.

MIDWINTER HOLDINGS

A country-wide canvass of onion stocks on hand January 1 was made by the Department of Agriculture in the war years 1917 and

1918. The general results are charted in Figure 13. Reports did not include the presumably small supply of stock still in the hands of the growers, but comprised returns from most classes of dealers and storages. Apparently wholesalers held nearly two-thirds of the stock in commercial channels at that time. Retailers laid in relatively larger stocks in 1917 after a season of very light production. Car-lot shipments after January 1 each season were one-third to one-half of the total holdings. It may be concluded that about that portion of the total midwinter wholesale stock is likely to be in country storages and available for carlot shipment. The remaining half to two-thirds represents the quantity already in or near consuming markets and quickly available for local supply, not including whatever quantity may be held at that time by local producers. Estimates from trade sources for the seasons from 1918 to 1921,

COMMERCIAL ONION HOLDINGS JANUARY 1 AND SUBSEQUENT SHIPMENTS, 1917 AND 1918

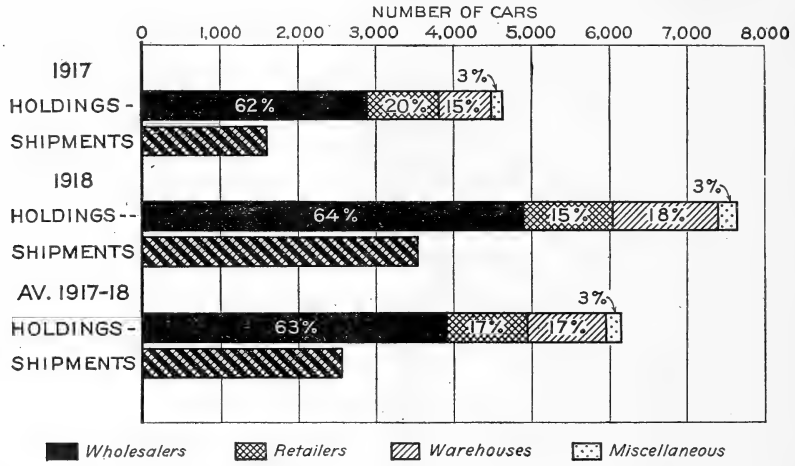

FIG. 13.—Car-lot shipments after January 1 each season average one-third to one-half the January holdings. Midwinter stocks are mostly in dealers' possession

inclusive, indicate that the equivalent of 1,000 to 4,000 cars of the January stock on hand were not shipped in car lots, but were used locally or accounted for by waste and shrinkage.

TRANSPORTATION

EARLY ONIONS

The first onions on the market usually bring the highest prices, and growers are likely to begin to harvest before the onions are fully ready for shipment and hurry them to market by the quickest method. The first Texas onions may come through by express; later most arrive by fast freight. A lot of early onions ready for shipping-point inspection and loading is shown in Figure 14.

The perishable nature of the product, the consequent necessary care in handling, the fast train schedule, but especially the long distance from field to market, make the freight and handling cost

very heavy. In the spring of 1921, the freight charges on 395 cars of Texas onions before they reached the receiver's hands amounted to $462 per car, approximately half (46.91 per cent) of the wholesale price. The average haul was 2,000 miles. Of the 395 cars, 124 were shipped by boat from Galveston to New York.

On 10 cars of California onions handled in Chicago in the spring of 1921 the freight averaged $401 per car, or 57 per cent of the wholesale price. In many cases during the season the onions were not able to bear the freight charge. The returns to the grower were so small that he was operating at a loss.

The problem of car supply is sometimes serious in the movement of the early crop. Favorable weather matures the onions so quickly that the marketing season becomes a feverish scramble to obtain

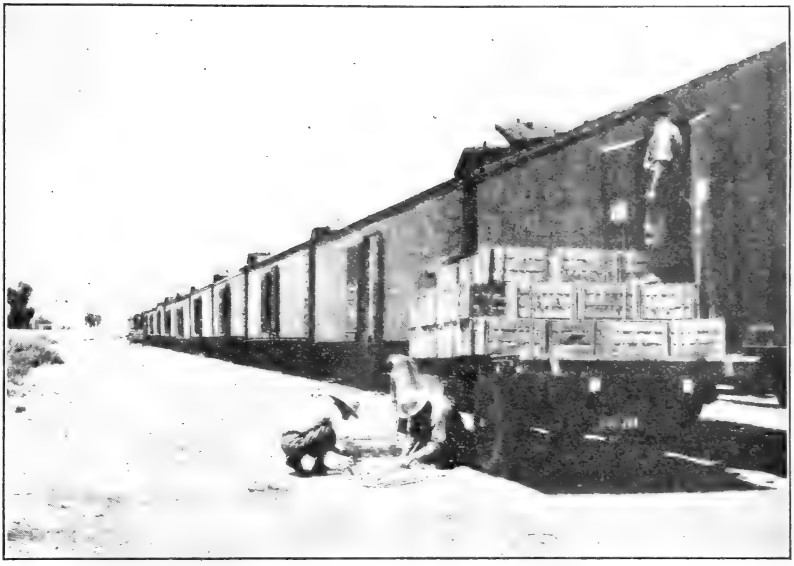

FIG. 14.—Shipping-point inspection of domestic Bermudas, inspector at work

cars and get the onions loaded and away. Consequently car shortage results and there is the difficult task of justly allotting empty cars to the numerous shippers.

The high railroad freight charges and the increased length of time in transit by rail have encouraged shipment by water from Galveston to New York City since 1921 to the extent of 10 to 15 per cent of the annual movement from Texas. On the whole, boat shipment has been successful. The time is not much longer than by rail and the freight charges are much less.

LATE ONIONS

Compared with many other vegetables, late onions are not difficult to ship by rail. Occasionally the early fall loadings are liable to injury by heat. Shipments after November 1 are usually in pro-

tected refrigerator cars to prevent freezing. The average carload of late onions contains 500 bushels. Heavy loading—600 bushels or more—is likely to result in injury to the bottom layers.

SEASONAL MOVEMENT

The movement to market begins about April 1 and lasts about 13 months, or until May of the following year. Occasionally the first early-crop shipments begin some time in March and on rare occasions the late crop does not get out of the way until early in June.

The peak shipment of domestic Bermuda onions occurs between April 20 and May 20, after which the shipments fall off abruptly. One-third to two-thirds of this crop goes to market in May. The average June shipments are the lowest of any month: the movement is about one-third as large as during May.

The late-crop movement begins in July, increases until about October 10 to 20, and reaches its lowest point in late November or early December, depending upon the severity of the weather and the volume of the crop. Practically all onions have gone into storage before the end of November, and later shipments come out of storage.

Between the Bermudas and late-crop movement, about 1,000 cars of intermediate onions are shipped, mostly from three States—New Jersey, Kentucky, and Virginia.

Details of the production and commercial movement of the crop are shown in tables in the last section of this bulletin.

The average carlot movement by months from the different districts for the five seasons 1918–19 to 1922–23 is shown in Figure 15. The short season for Texas Bermudas is followed by about 130 cars of later onions which come on the market from the last of July to late August and compete with the northern "set" onion crop. The late California crop also has a long season.

In 1920, 1921, and 1922, 65 to 70 per cent of the northern crop was shipped before December. The year 1920 was one of large production and very low prices. Growers sold freely and a great volume was at once put on the market. On the other hand, more than half the crop remained for shipment on November 1. During November, 12 per cent of the crop was shipped and 39 per cent was shipped after that month.

In the fall of 1921 prices were rather high and prospects favorable for still higher levels. The crop was light and the storing quality good. Nevertheless the comparatively high prices offered by the local buyers induced farmers to sell early. By November 1, about 61 per cent of the crop had moved, 7 per cent was shipped in November, leaving about 32 per cent in storage for winter shipment. This was about a normal quantity—4,000 cars.

AREAS OF DISTRIBUTION

No records are available to show where all the onions from the different producing areas find a market. Some information has been gathered by field agents of the Bureau of Agricultural Economics regarding the principal destination of early shipments from loading points in Texas, southern California, and a few other sections for

certain recent years. The department of agricultural economics of the Massachusetts Agricultural College for some years has collected data from station agents in the Connecticut Valley showing the

CAR-LOT SHIPMENTS OF ONIONS FROM PRINCIPAL SHIPPING REGIONS BY MONTHS, AVERAGE OF SEASONS 1918 TO 1922

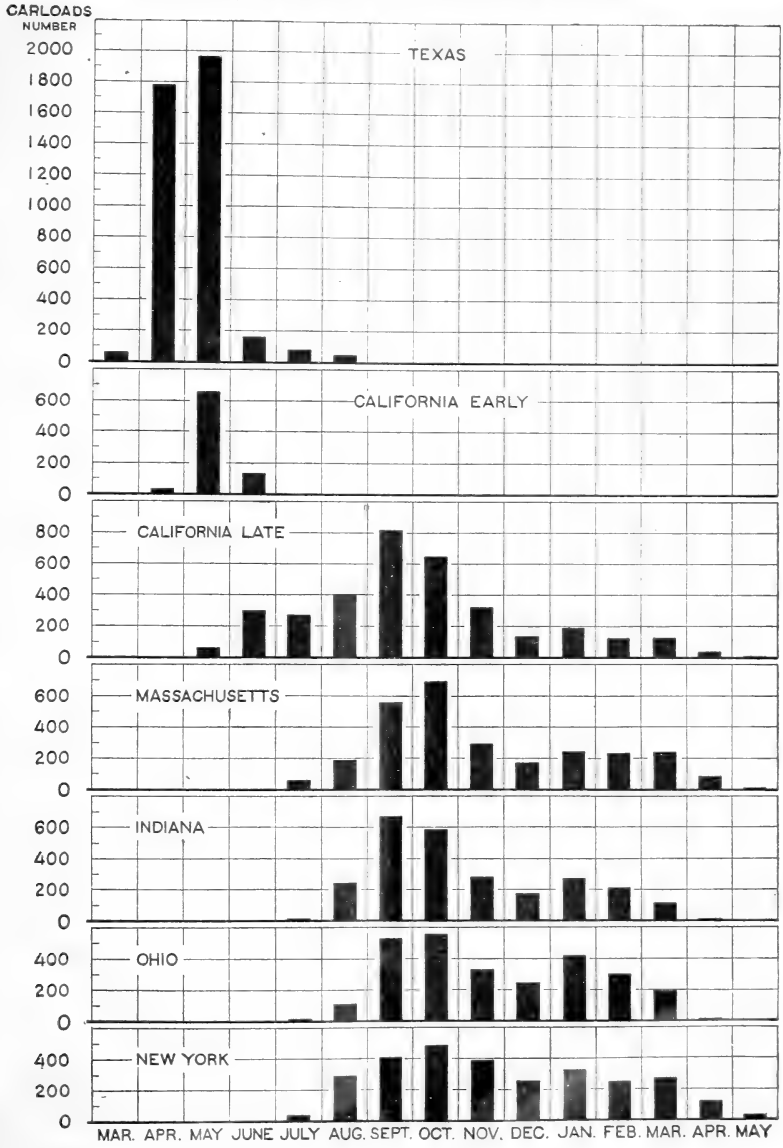

FIG. 15.—Shipments are heavy in spring and fall months

waybill destinations of onions from all shipping points in the valley. Figures 16, 17, and 18 show maps made from the data thus gathered in 1922 and 1923.

The maps show State totals only. They do not show the individual station destinations within the States, and, being for one year only, they can not show the very significant changes in distribution which occur from year to year, partly due to the size of the crop, partly to transportation conditions, and partly to the state of the market.

TEXAS

Distribution of Texas onions for the season of 1922 is shown in Figure 16. Destinations of 4,118 cars numbered 223 towns and cities in 44 States and the District of Columbia, 4 Canadian Provinces, and Cuba. Large numbers of these cars were diverted from the original destinations and an attempt has been made to trace shipments beyond the main diversion points, of which Kansas City is the largest. It has not been possible, however, to establish final

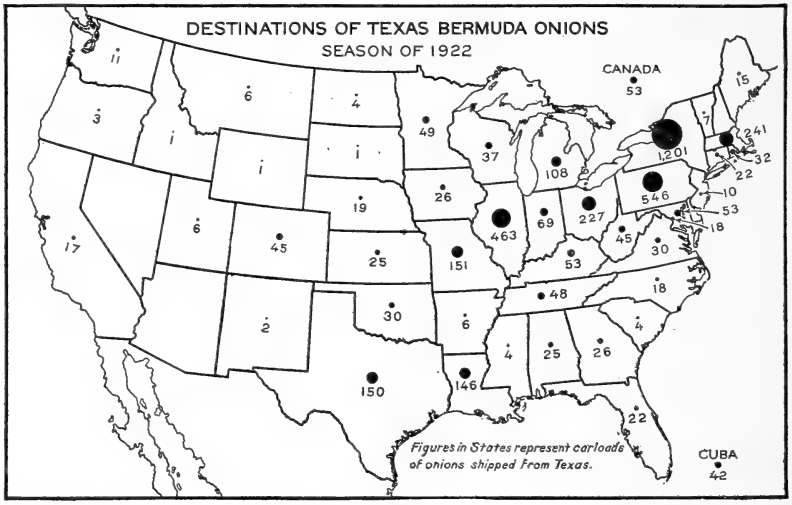

FIG. 16.—Texas onions go to practically every State, and are exported to Canada and Cuba

destinations in all cases. At any rate, there are 223 points with a capacity for one or more carloads of Texas onions. The number of long shipments is astonishing: Boston, 2,350 miles distant, 227 cars; New York, 2,100 miles, 1,009 cars; Montreal, 2,500 miles, 9 cars. Freight charges from Laredo are the same to each of these cities.

At least 101 cities received one or two carloads each and 43 cities three to five. Of the 223 destinations, 177 received 10 cars or less each. Only 27 cities are credited with more than 20 cars each and but 13 received 50 or more. The widest distribution was in Texas and New York, with 17 and 16 carlot destinations, respectively.

SOUTHERN CALIFORNIA

Destinations of 1,044 cars of Bermuda onions from the Coachella and Imperial Valleys of California in 1922 numbered 55. These are not final destinations in all cases, as numerous cars are always recon-

signed. Thus, while 263 cars were reported shipped to Kansas City, only 34 were actually unloaded at that point. On the other hand, while 267 cars were originally sent to Chicago, unloads reports from that city show 374 cars from California during the Bermuda season of 1922. Evidently more than 100 cars of Bermuda onions received at Chicago had been reconsigned en route, probably most of them from Kansas City. Consignments to smaller destinations are usually more reliable, as cars will hardly be sent to such places except under definite previous arrangements. Thus, of the 1,044 cars, shipments were reported to 26 States and Canada, 7 of the States receiving only 1 car each and Canada taking 11. Los Angeles and San Francisco together received 125 cars, some of which were no doubt for diversion. Of 140 cars shipped to Texas, 124 went to El Paso, most of them for reshipment by boat. In spite of numerous diversions from the few large cities receiving the bulk of the California stock, some tendency has been shown to oversupply large markets to the exclusion of the smaller ones. Some inclination has also been shown to harvest immature stock in an effort to lessen competition with the bulk of the Texas crop. But best results seem to have been obtained usually by harvesting at the proper stage of maturity, relying upon strict grading and certification and wide distribution to overcome the handicap of California's longer freight haul and insure successful competition with the Texas stock.

CONNECTICUT VALLEY

The crop from the Connecticut Valley is distributed over a much smaller and more compact area. The primary destinations of 1,299 cars of the 1922–23 season are shown in Figure 17. Records of shipments for several years show that the consuming area of these onions varies greatly with the size of the crop, the condition of the crop in competing regions, and the charges for transportation. The 1920 crop of about 4,000 cars was billed out to 197 destinations. Of the 1922 crop, the record of only 1,299 cars is available. These were shipped to only 115 destinations showing the effect of a light crop. Both of these crops were distributed almost entirely in New England, New York, Pennsylvania, and New Jersey. Only 13 other points in 1920 and 12 others in 1922 received direct carloads of Valley onions. In 1919 the destinations of 3,000 cars numbered 167, with 30 destinations beyond the States mentioned. The increased freight rates of 1920, together with the lower price level, greatly restricted the shipping territory as compared with 1919. Approximately 266 cars of the 1916 crop of 3,300 cars went to cities in 21 States and Canadian Provinces outside the States mentioned above, from Cuba to Halifax. Only 45 of the 1920 crop of 4,000 cars went outside the area, and to only nine States and Provinces. Fifty-five of the 1,299 cars of the 1922 crop were distributed to 10 outside States and Provinces.

Ordinarily Massachusetts takes two-fifths of the Valley onions, New York one-seventh to one-fifth, Pennsylvania one-tenth to one-seventh, and Connecticut about one-tenth. Very few cars are sent north of the Canadian boundary, south of Philadelphia, or west of Pittsburgh, although a few are now going to Cleveland and Detroit.

In New England, 141 towns and cities received direct car-lot shipments of Massachusetts onions in 1920–21. A few of these were doubtless shipments for diversion, but probably more than 135 cities and towns in New England are able to handle and consume late onions by the carload. Boston is hardly holding its place as a receiver of these onions. Worcester, Hartford, and Springfield seem to be increasing in importance as receiving cities.

FIG. 17.—Distribution of Connecticut Valley (Massachusetts) onions is usually limited to a few Eastern States except in seasons of shortage in the Middle West

WESTERN NEW YORK

In shipping season of 1923–24, primary destinations of 1,672 carloads of onions from western and central New York were placed on record. (See fig. 18.) About one-fourth (417 cars) of these went to New York City, one-eighth (203 cars) to Philadelphia, 120 to Boston, 96 to Buffalo, 76 to Baltimore, and 62 to Providence. Nearly one-half (766 cars) was shipped to cities and towns of New

York. Pennsylvania received 353 cars and Massachusetts 175. Less than the usual quantity was shipped to markets of the Middle West because of the season's heavy local supply in that region, and nearly the whole output was distributed in the Atlantic States and New England. The principal area of distribution is similar to that of Connecticut Valley onions, but in both cases a larger proportion is shipped into States nearest to the source of supply.

FIG. 18.—Distribution area for New York onions is similar to that for Massachusetts (Connecticut Valley) stock. In each case a large proportion is shipped to States nearest the source of supply

WHOLESALE MARKETING

The prevailing marketing route for onions is from country dealer or agent to city carlot receiver and thence in succession to jobber, to retailer, and to consumer.

The bulk of the car-lot supply is bought through dealers located at shipping points or is shipped by their agents at these points, or handled by city brokers operating in behalf of country shippers or

cooperative associations. Commission sales of car lots are a small part of the trade in most city markets; but considerable local crated stock and numerous small-lot shipments are handled on commission, and a small proportion of the early northern receipts is sold at auction (fig. 19).

There are no dealers who handle onions exclusively except in one or two great markets like New York, but in many large cities there is a group of receivers and jobbers who handle mostly onions, cabbage, and potatoes. In small city markets the dealers in a more or less complete line of general produce handle onions.

Most sales by car-lot receivers are of broken lots of 25 to 100 packages, to jobbers and small wholesalers who depend on the receivers for their supplies from day to day. In some cities many

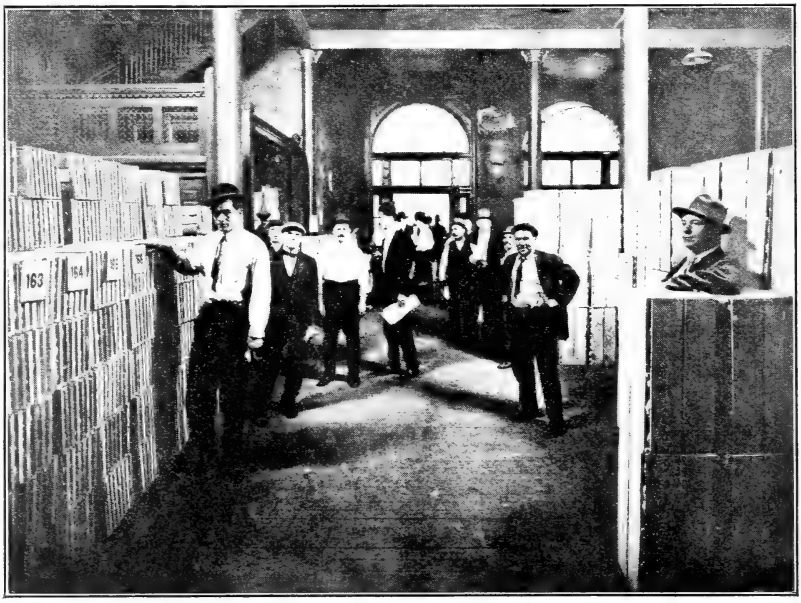

FIG. 19.—Texas onions are offered at a few of the produce auction sales

retailers buy directly from cars, buying as few as one or two packages at a time, usually at a premium over jobbing prices, but most sales to retailers in the great city markets are made by wholesalers and jobbers, from stores and the various public markets.

Car-lot sales are sometimes made in the wholesale markets to speculators who depend mostly on the peddler trade, though frequently these sell to jobbers at a slight advance over cost. Some car-lot sales during the late fall and early winter months are made to out of town buyers and to jobbers and wholesalers who wish to store onions.

The chain-store grocery companies handle as high as 15 per cent of the receipts in certain markets. They buy mostly f. o. b. at shipping point, but whenever short of supplies they appear on the local market.

In markets below the first rank the services of the various dealers are not clearly distinguishable. The car-lot receiver may be the jobber also and he may sell in any quantity from one package to a carload, or he may even sell at retail. Occasionally he receives some stock for sale on commission.

There is practically no distinction in such markets between receivers and jobbers, for the majority of the receivers job their stock. In middle-western cities there is a distinction between these two classes of dealers and the small wholesalers who buy from the jobbers, unload the stuff into the store, and usually sell direct from the store or from the sidewalk in any quantity asked for. Such sales are considered wholesale and the buyers in such cases must call for their purchases.

Frequently when it is known the stock will be of a quality and condition that will meet requirements of the buyers, orders are taken before the car arrives. If the receiver is the jobber, as in many cities of 500,000 or less, he usually hauls the bulk of the car to his store to supply his needs, and any surplus is distributed among a few of the other jobbers. In late fall and early winter carloads are purchased direct or through brokers by both wholesalers and jobbers to be stored for future needs. As a rule the smaller the market center the more confused is the marketing, and the more pronounced the tendency to combine the functions of the different classes of dealers. Often the marketing systems of the smaller cities and towns are simple in appearance only, the market being practically a branch of some larger city market and drawing most of its outside supply from the various wholesale distributers there. In some cities of small to medium size several small dealers combine to purchase full carlots through brokers, avoiding the usual jobbers' margin.

The home-grown stock hauled from adjacent farms constitutes from 5 to 15 per cent of the onion supply of most large markets, and from one-third to a much larger proportion of the supply in many smaller markets near local producing areas. It is sold in a variety of ways, depending on how far the producer can dispense with the wholesale dealers. Most growers close to market have small crops, which they cart or truck to town and sell in small lots to retail merchants or peddlers. Larger quantities may be sold to jobbers either by the load or by the whole crop. If the quantity is very small, the grower is likely to peddle it out with other vegetables to consumers or ship it in small lots to city commission dealers. The larger the quantity and the longer the distance from market the less the degree of personal attention on the part of the grower and the greater his dependence on the services of agencies of transportation and sale. Some of the variations of the wholesale onion trade are described in the accounts of representative city markets.

FEATURES OF CITY MARKETS

EASTERN MARKETS

New York City.—Of the 4,500 carloads of onions unloaded annually in New York City, two-thirds are received from four States (see figs. 20 and 21 and Table 8). Nearly one-third comes from

New York, about one-seventh from Texas, one-eighth from Ohio, and one-tenth from Massachusetts. California supplies one-twentieth. Indiana furnishes one-tenth.

Home-grown receipts are estimated at about 5 to 7 per cent of all arrivals, fairly large supplies in less than carlots coming from Long Island and New Jersey. Very few domestic onions, probably about 5 per cent of all receipts, are shipped out of the city.

Imports are an important factor. They are received from Spain, Egypt, Italy, Holland, Australia, South America, and the West Indies. They constitute over 6 per cent of all receipts unloaded for local consumption.

AVERAGE CAR LOTS OF ONIONS UNLOADED MONTHLY AT NEW YORK BY PRINCIPAL SOURCES OF SUPPLY, 1918 TO 1922

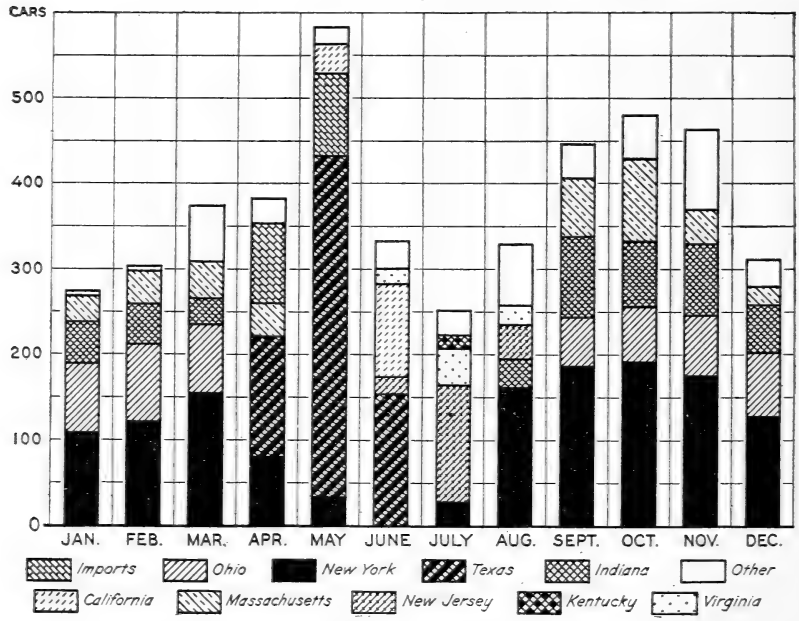

FIG. 20.—Peaks of New York's onion supply include many southern, imported, and State onions

The city receives its supplies almost entirely on the piers of the New York Central, Erie, and Pennsylvania Railroads, and of the Morgan and Mallory steamship lines. A little over half the Texas onions received at New York come by boat from Galveston and are unloaded and sold on the pier. A few early onions are received in Jersey City to be trucked over to the stores in the Washington Street market. New Jersey stock is trucked directly to receivers' stores.

In New York City onions are handled in practically the same way as other fruits and vegetables, the first receivers selling to jobbers and the jobbers selling to the retailers. Four or five large receivers specialize in handling onions and three or four large jobbers handle practically nothing but onions. These dealers have stocks on hand

almost the entire year. Most of the direct receivers buy at shipping points; they also receive on consignment and a small number of them maintain their own acreages in the principal producing sections.

Late onions in 100-pound sacks and early stock in bushel crates are generally sold on the piers to the jobbing trade in lots averaging 10 to 15 packages. On the other hand, jobbers handle in car lots a larger proportion of onions than of any other product except watermelons. The jobbers sell generally in units of one to five packages to the retailers.

Boston.—Three States supply nearly 70 per cent of Boston's onions (see figs. 22 and 23). Nearly one-half (45 per cent) came from the Connecticut Valley in 1920 and 1921; about 20 per cent came from Texas, 9 per cent from California, and 15 per cent was imported from other countries. In the fall of 1922, owing to the

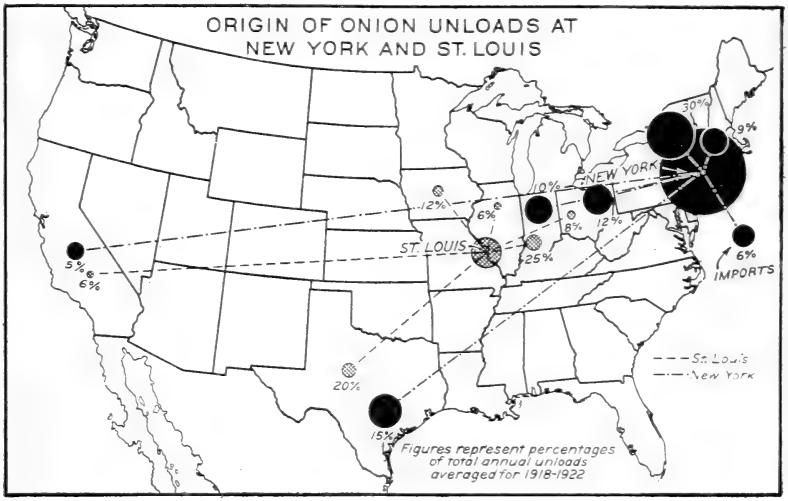

FIG. 21.—More than half the car lots received at New York come from three States: New York, Ohio, and Massachusetts. Texas stock averages 15 per cent of the total car-lot supply at this market. St. Louis unloads about one-eighth as many cars as New York, chiefly from the Middle West and Texas

poor quality of Massachusetts onions, there were large shipments from Michigan, Indiana, and Ohio, so that for the calendar year 1922 less than one-third of the receipts were from the Connecticut Valley.

Most of the onions on the Boston market are bought direct from the country shippers, although a considerable quantity is handled on commission. Imported stock as a rule is bought at Liverpool by representatives of the local firms and shipped direct to Boston. In case of short supply the dealers may buy in New York.

Unlike the New York and Philadelphia markets, the sales of car-lot receipts do not take place at the immediate point of arrival but at the wholesalers' stores, where they have been hauled by wagon or truck.

Boston is the distributing center for imported and western or southern grown onions to most of the New England towns, but with

onions that are raised in the Connecticut Valley and near-by States only those towns within a radius of about 30 miles are supplied from Boston. Other towns receive their supplies directly from the pro-

AVERAGE CAR LOTS OF ONIONS UNLOADED MONTHLY AT BOSTON BY PRINCIPAL SOURCES OF SUPPLY, 1920–1922

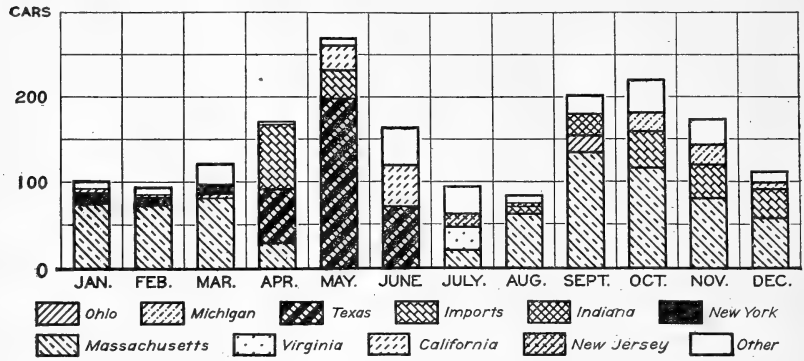

FIG. 22.—The bulk of Boston's supply comes from Massachusetts except during three months of the Texas season

ducing sections or from other cities large enough to distribute onions in carlots.

Philadelphia.—This city depends upon nearly the same sources of onion supply as New York (fig. 24). New York State furnishes

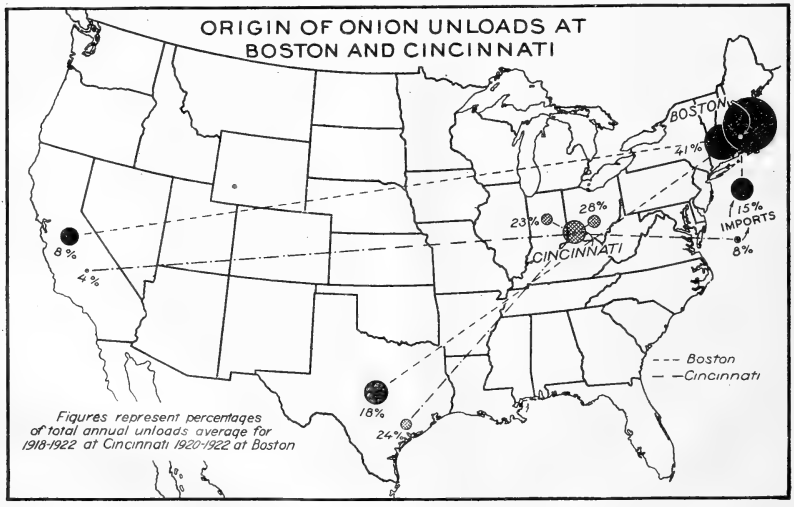

FIG. 23.—Nearby producing sections supply more than half of the car lots unloaded at Boston and Cincinnati

more than one-fourth, Massachusetts about one-seventh, and Texas one-sixth of the average number of car lots received annually. Indiana sends about 7 per cent and Ohio nearly 10 per cent. About 100 carloads of imported onions are received annually, mostly during

the fall and winter. Home-grown stock materially influences the market during the late summer. Onions are on the market the year around, with supplies averaging about 150 carloads per month.

The demand is slightly more active in cold weather, but the supply is fairly uniform throughout the year. Practically all stock except that grown near by is sold at the market house. The home-grown stock is sold by commission merchants on Dock Street and in the Callowhill Street sections. The chain-store grocery companies handle over 15 per cent of the total receipts and are a considerable factor in the market.

Baltimore.—Practically all stock received in Baltimore during the fall, winter, and spring arrives by rail at the Bolton railroad station. During the Virginia shipping season (July and August) all stock arrives by boat and is sold on the piers by receivers to all

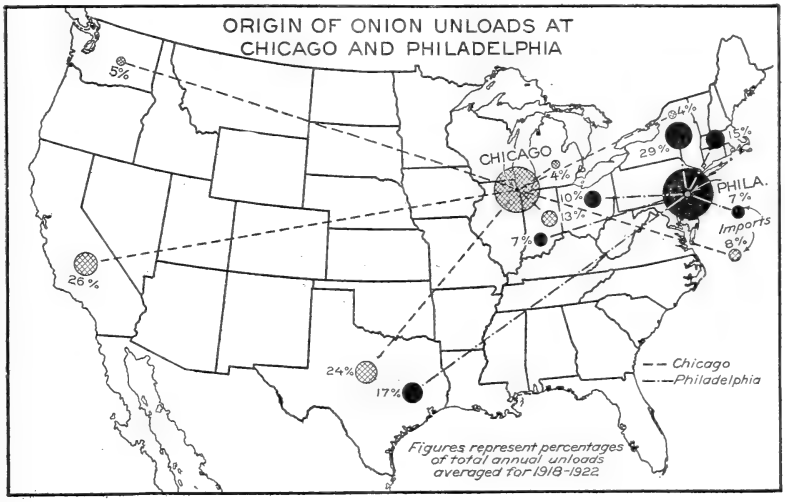

FIG. 24.—Car-lot unloads at Philadelphia exceed those at Chicago in an average season, but are mainly from different sources

classes of dealers. Several receivers specialize in potatoes and onions. Considerable stock is bought outright from the shipper. Receivers sell to jobbers partly direct from the cars and partly by samples displayed on the sales platform in lots of 25 packages and over. The jobber then hauls them to his store for resale.

Washington, D. C.—The Washington market is supplied in season principally with the northern type of onions, preferably the yellow varieties, from New York, Massachusetts, Pennsylvania, and the Middle West; the southern Bermuda yellow varieties; and a few Crystal Wax from California and Texas. Australian Browns are acceptable and some imported Spanish Valencias are received. Few onions except the green bunched stock are grown locally. Car lots are received by a few large dealers and distribution is mostly in small lots to retailers.

Pittsburgh.—An onion market of the first rank is Pittsburgh, which draws on practically every onion-shipping State for its supply, although 21 per cent comes from Texas and 9 per cent from

California (fig. 25). Ohio and Indiana together furnish about 34 per cent. A number of States contribute the remaining one-third. Onions of every grade, quality, and condition are offered for sale during the year, and buyers usually have no difficulty in finding stock that meets their requirements.

The territory of distribution in either mixed or solid cars includes most towns within a radius of 50 to 75 miles. Home-grown supplies appear on the market only during the late fall and then in very limited quantities. They are usually of poor quality. Imports of Spanish onions are received in considerable quantity and meet good demand from hotels and restaurants.

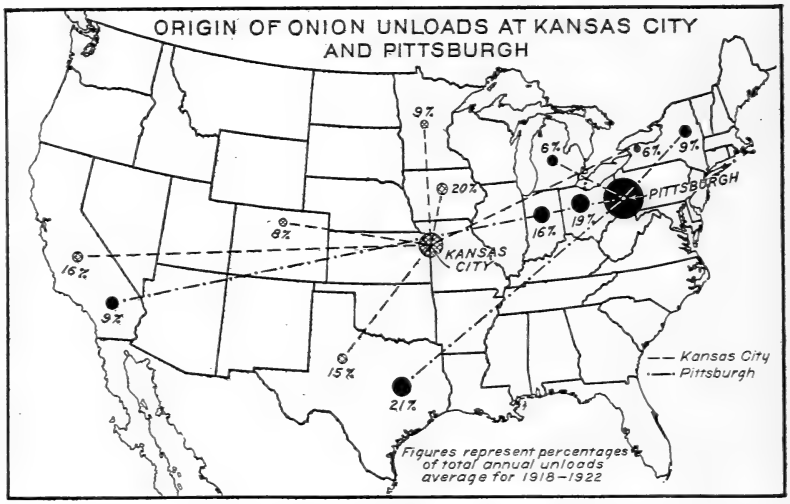

FIG. 25.—Pittsburgh and Kansas City take liberal supplies from most of the commercial onion regions

MIDWESTERN MARKETS

Chicago.—More than one-fourth of Chicago's car-lot receipts (nearly 350 cars) are shipped from California and one-half of the total supply comes from California and Texas together (figs. 24 and 26). The near-by States of Indiana and Michigan together unload 17 per cent.

A number of Chicago dealers specialize to a certain extent in a combination of onions, cabbage, and potatoes. Some have warehouses in Indiana, Michigan, and Ohio where stock is stored until wanted, in bushel crates just as purchased from the growers.

The Illinois supplies come almost entirely from around Chicago, and from September 1 to about December 1 constitute a substantial part of total receipts. Imported Spanish onions arrive almost every month in the year and average approximately 8 per cent of the entire onion receipts. Occasionally a car of Egyptian onions arrives.

Chicago supplies most of the onions consumed within a radius of 75 miles, except during the period of home-grown supply. A number of dealers on South Water Street specialize somewhat in this trade.

Cleveland.—Practically all the producing sections supply Cleveland with onions, but in the fall and early winter the bulk of the stock comes from the section around McGuffey, Ohio. If stock from this section is good and is sufficient in quantity, onions from other States find competition keen and demand slow. Early in the spring, when supplies of Ohio-Indiana stock have been cleaned up, buyers must look to other sections for their supplies. Connecticut Valley onions have a good reputation on this market and are usually sold at top prices. During late spring and early summer some California Australian Browns appear.

Few onions are sold directly from cars. The wholesale receiver loads the onions upon trucks which, with a salesman aboard, make the rounds of the jobbers and chain-store operators. If the car can not be disposed of in this way, the remainder is taken to the receiver's store, there to be displayed for sale.

AVERAGE CAR LOTS OF ONIONS UNLOADED MONTHLY AT CHICAGO BY PRINCIPAL SOURCES OF SUPPLY, 1918–1922

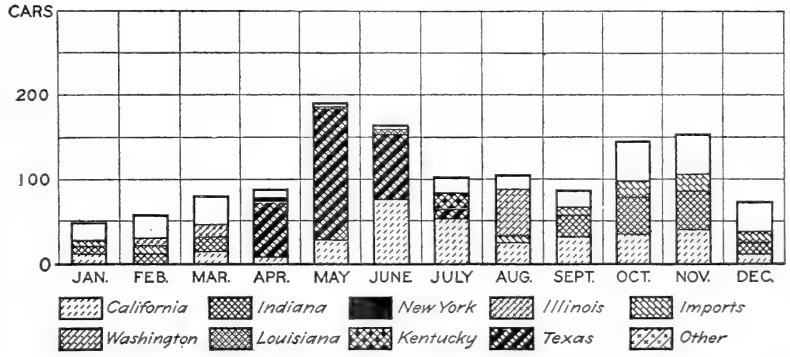

FIG. 26.—Texas and California each contribute about one-fourth of Chicago's car-lot supply. The Texas stock comes mostly during April, May, and June, and receipts from California continue throughout the season

Cincinnati.—Three-fourths of the car-lot supply of onions for Cincinnati is furnished by three States, Texas averaging 24 per cent, Ohio and Indiana together over 50 per cent (fig. 23). In addition, Ohio furnishes from 5 to 15 per cent of the total supply as home-growns during a period of about six weeks in midsummer. Receipts from Texas appear to be steadily increasing. Imports are of minor importance; 30 to 40 cars are handled in a normal year. No Cincinnati dealers specialize exclusively on any one vegetable. A system of "team tracks" permits the holding of perishable supplies in the cars in which they arrive until sale and delivery. Few sales are made in carload lots, wholesalers take lots of 10 packages or more, and jobbers frequently buy directly from the cars on the unit-package basis. Retailers may obtain supplies either from jobbers or wholesalers, and may have purchases delivered on payment of a nominal fee for drayage (usually 5 cents per package). The consuming area for this market includes small towns and cities within a radius of 40 miles. Demand is principally for yellow stock, as in most other cities, with a distinct prejudice against red onions.

St. Louis.—Most of the onion supply of St. Louis is received in the various railroad yards maintaining team tracks. The tracks are from two blocks to over 2 miles from the produce market on North Third and Fourth Streets, whither the stock is usually hauled by wagon or truck, and where it may be inspected by those who wish to buy. When sold, it is hauled to the store of the buyer.

Figures recently compiled show that the average daily consumption of onions on this market is approximately two cars. The stock from Indiana constitutes 25 per cent and that from Texas and California 27 per cent of the entire quantity taken (fig. 21). Illinois and Iowa furnish almost one-fifth of the car lots received. During July and August St. Louis is practically supplied by stock grown within a radius of 10 to 15 miles. This home-grown trade is approximately 10 per cent of the entire onion business for the city. Imported stock, mainly of the Spanish Valencia type, amounts to approximately 3 per cent. Texas stock is the main feature of the spring onion trade. The Red Globe is preferred to the yellow onions in this market.

In addition to the cars actually unloaded at St. Louis, numerous cars received here are reconsigned to destinations in almost all of the eastern States.

Kansas City.—Most of the car-lot supply of onions received at Kansas City comes from west of the Mississippi (fig. 25). Iowa furnishes 20 per cent, California and Texas together over 30 per cent, Minnesota 9, Colorado 8, and New York only about 6 (Table 8). The market prefers red onions, but a great many Australian Browns from the Pacific coast and yellow and white Globes from the Middle Western States are consumed. A few cars of Bermuda onions from Mexico are sometimes received in spring, but the quality is ordinary and movement generally slow. Some Creoles arrive from Louisiana in early summer, after which the home-grown stock begins to come on the market. The usual home-grown varieties are Red and White Globes, although some Yellow Globes are produced. Late-crop onions usually are stored locally, but occasionally are held at producing points from which they can be brought on the market as needed. During the winter Kansas City generally supplies the surrounding towns within a radius of 50 miles, and many diversions of car lots are made to Oklahoma, Arkansas, and Texas.

Minneapolis.—Most of the onions sold in Minneapolis are handled by general fruit and vegetable wholesalers, who buy direct from the shippers or through brokers, with practically no commission business. Home-grown onions constitute nearly one-third of the supply. According to local estimates fully half of the stock sold in Minneapolis is shipped to country trade in less than car lots. The city is also a center for distribution of onion shipments to Minnesota, northern Wisconsin, North Dakota, South Dakota, a part of Montana, and a portion of Canada.

Milwaukee.—The city of Milwaukee lies near one of the large onion-producing areas, and approximately 75 per cent of the city's supply is drawn from near-by farms. A few cars of late stock are received from Indiana, Illinois, Colorado, California, and Washington; early onions come from Texas and California, and an occasional

car of imported Spanish onions is received. Most stock is distributed through commission merchants and thence through the usual trade channels to the consumer.

SOUTHERN MARKETS

Atlanta.—Like other cities of the Southeast, Atlanta receives onions from most of the shipping States. Home-grown stock supplies the market in midsummer and a few Spanish onions are received. Most sales of wholesale lots (5 to 50 packages) are to jobbers at the broker's or receiver's warehouses. Many small lots are shipped to towns within 100 to 150 miles.

New Orleans.—Onions are handled by practically all of the local jobbers in New Orleans. Sales to them are usually made f. o. b. usual terms on the 100-pound basis and are mostly confirmed as U. S. No. 1 grade. The railroads unload shipments on shed platforms, from which the stock is jobbed out to the trade. Consequently only a small percentage of the onions received is taken to the produce district, which is from 6 to 10 blocks from the unloading sheds. Probably the main feature of this market is the home-grown crop.

WESTERN MARKETS

Los Angeles.—The Stockton district in central California, home-grown sources, Riverside County, and Utah, in the order named, supply the Los Angeles market. Early or Bermuda onions come from the Coachella and Imperial Valleys except a few cars from Texas when the crop in that State is more than two weeks earlier than California. Bermuda-type onions are usually sold by car-lot receivers or brokers to jobbers in 50 to 100 crate lots. Late onions are mostly sold to jobbers in carload lots. Only when the market is dull and sales slow will receivers break cars, but under such conditions lots as small as 50 sacks will be sold. Jobbers sell to retailers in lots of 1 to 5 sacks or crates.

Denver.—About half the supply used in Denver comes from Colorado, possibly 25 per cent being raised nearby and the remainder coming partly from the Greeley section but chiefly from the Western Slope. These onions fill the market for about eight months; then Denver draws on Texas, California, Washington, Utah, Idaho, and Oregon. Six cars of imported Spanish onions were handled in 1923. The stock from other States is received in 100-pound bags or standard crates, but Colorado onions are received in various-sized sacks and sold "sacked per 100 pounds." Many of the onions are trucked into Denver and sold by the growers to jobbers, wholesalers, and retailers. No dealers specialize in onions, although two concerns handle potatoes and onions only.

NORTHWESTERN MARKETS

Portland.—Onions from Texas, California, Washington, Oregon, and occasionally from Australia are consumed in Portland, Oreg. Most stock shipped in from other States moves in carloads made up by brokers, each of several wholesalers having ordered a definite number

of packages, and hauling his own order when the car arrives. A part of the receipts are reshipped with other vegetables in mixed car lots to towns within 150 miles.

Seattle.—Conditions are similar in the onion market at Seattle except for the prominence of the onions from the Yakima Valley. The Oregon onion commands a premium; but, because of the freight rates, Yakima onions hold the market as long as the stock from that section arrives in good condition. The heavy demand for onions in the Northwest is from September to May while logging camps are active.

MARKET PREFERENCES

The yellow varieties, both in the early and the late crop, are given preference in eastern markets. Red or pink stock is not much wanted, except in a few cities of the South and Southwest, particularly St. Louis and Kansas City. White stock meets only a moderate demand anywhere. At times, especially in the fall, small, white pickling onions sell at a high premium over all other stock, but the outlet for these is limited. Australian Browns sell well in competition with the yellow stock and at times bring a slight premium over the eastern onions, but supplies are light.

In size, the medium onion is most desired. Prices have considerable bearing on this feature. When prices are low a fairly large onion is wanted; but if prices are high medium sizes are given preference, because of the demand of the small retailer who sells onions by the pound or in even smaller quantities. The number of onions in the pound is the factor considered by the consumer. Preferable sizes of domestic early and late stock are from $2\frac{1}{4}$ to $2\frac{3}{4}$ inches in diameter. Boilers do not sell readily and except in New York and a few other markets usually have to be moved at a substantial discount. Preferable sizes of Spanish onions are from 3 to $3\frac{3}{4}$ inches in diameter with the one-third crate the best seller.

The 100-pound open-mesh paper fiber bag is the preferred container for old stock but does not always justify its expense over the burlap sack. Onions in secondhand burlap sacks may sell at a discount of 10 to 50 cents on account of package and appearance. The standard ventilated crate is the usual container for Bermuda stock, as it affords ventilation and enables the buyer to see what he is buying. The small crate, packed 50 to 72 to the crate, is the most popular package for imported Spanish stock. The demand for the large cases is limited.

SUPPLIES OF LARGE CITIES

The maps (figs. 21, 23, 24, and 25) show principal sources of carlot supply for certain leading city markets by percentage of total received from each of the States shown. Tables 4, 5, 6, 7, and 8 gives annual car-lot unloads at principal cities, with respect to total shipments, population, variations from five-year average, and principal sources of supply.

There are no accurate figures on the total consumption in the United States, but the number of carloads unloaded in 12 principal cities of the country with an aggregate population of approximately 21,700,000 people in their metropolitan districts (as defined by the

Bureau of the Census) has been compiled by the Department of Agriculture since 1917. These unloads include only mature early and late stock, and take no account of bunch onions.

Taking the figures as given in Table 6, about 6,300,000 bushels are unloaded annually in city market districts with a total population of 21,700,000 people, or about 15 pounds of onions for every man, woman, and child.

Although these cities contain less than 40 per cent of the whole urban population, the unloads reported are equal to more than half of all the onions shipped to market in carload lots. Most of the cities in question reship some of their onions in less than carload lots to other cities and towns and supplement their unloads by supplies of home-grown onions, locally estimated at 5 to 30 per cent of the total supply.

The indicated populations do not represent the total consumers of the cities in question; but, on the whole and for purposes of comparison, they may be considered fairly inclusive, since the receipts of home-grown onions to some extent balance those that are shipped out in less than carload lots. Pittsburgh and Kansas City are great distributing centers for partial carloads, and New York sends out many truck loads to urban towns and cities within a 50-mile radius. The importance of Boston, Pittsburgh, and Kansas City as distribution points is shown by their very high per capita receipts.

Taking the population figures as given in Table 6, Boston is the city of greatest proportionate onion consumption. It uses about 25 pounds per capita, as compared with 14 pounds for New York City. In 1920, 1921, and 1922 the total unloads were greater than for any city except New York, but the per capita difference is partly owing to numerous shipments in small lots.

St. Paul and Minneapolis have the smallest car-lot consumption, due, in part at least, to the large number of home-grown onions marketed. Chicago also has a low apparent consumption.

These great cities seem to take about the same quantity year after year, no matter what the price of onions or the prosperity of the people. This is indicated in Table 7, which shows the average number of cars unloaded annually, the yearly total, and the yearly variations from the average. Deviation from the five-year average unloads for 11 cities ranged from 0.6 per cent in 1921 to 12 per cent in 1922.

The small variation from the average demand is striking. In three years out of five the unloads reported at 11 principal cities varied not more than 2½ per cent. Of course, the unloads in individual cities varied greatly from year to year, much more than the totals, but probably no vegetable crop shows greater uniformity in volume of receipts at the principal markets.

Since 1918 the figures indicate a fairly consistent increase in the number of cars unloaded in these markets, although the production of onions and the shipments from country points show no such tendency. The more complete and accurate reports of the later years may partly account for the differences shown.

The shipment figures tell a very different story. Shipments fluctuate with the volume of the crop. Table 7 shows an extreme varia-

tion of 28 per cent in shipments and only 20 per cent in unloads, using the high and low figures for five years.

On the other hand, the destinations of shipments differ much in different years. In years of abundance many cars go to small cities. In lean years large cities receive most of the crop; smaller places go without or depend on less than car-lot shipments from the larger markets.

The reported unloads include three kinds of onions: (1) The main or late crop from Northern States; (2) the early or southern crop, chiefly Bermudas from Texas and California; and (3) imported onions from Spain, Egypt, Bermuda, and a few other points. Most imports are landed at New York, Boston, and Philadelphia. Onions grown from sets in the late-crop States and harvested before the late crop is put on the market are not separately reported by the Department of Agriculture, but are included with the late-crop unloads. The early onions unloaded at 12 markets amount to approximately 3,000 cars yearly (Table 5), out of an average of nearly 13,000 carloads of all varieties, but they fluctuated from about 2,800 to around 3,800 during the three seasons 1920 to 1922. This is, roughly, between one-fifth and one-fourth of the total cars unloaded at these cities. Great variations in the relative quantities of early and main-crop onions occur from season to season and from city to city.

About 20 per cent of the onions that New York uses are Bermudas and 80 per cent are of the main crop. Early onions ordinarily make up about one-third of Chicago's supply. Twenty per cent of the onions unloaded at Philadelphia are early stock.

Included in the reported unloads of late onions in the 12 cities is a variable quantity of imported stock, which from 1920 to 1924 averaged over 2,000 cars per year.

SEASONAL CONSUMPTION OF CITIES

Onions arrive at the city markets every month in the year, but the unloads are by no means uniform. For cities of record, May is usually the month of heaviest receipts. Since most of the spring receipts are of early onions which can be stored only for a short time, it would seem that city consumption is heaviest during the flush period of early-onion shipment. September and October are the months of greatest receipts of onions for storage, though during the first half of November unloads are often large, especially in the more southern of the 12 specified cities.

Some interesting features are characteristic of different cities. Figure 27 indicates the average monthly unloads at seven principal cities for the years 1918 to 1922, inclusive. The individual fluctuations are well brought out. It must be borne in mind that many late onions go immediately into storage on arrival at the city markets, so that receipts and consumption of late onions do not necessarily mean the same thing.

VOLUME OF SHIPMENTS

The car-lot unloads reported at 12 cities include more than half (53 per cent) of all onions shipped from the commercial-producing regions. Data are now being collected which will indicate where a

AVERAGE CAR LOTS OF ONIONS UNLOADED MONTHLY AT SEVEN PRINCIPAL CITIES, 1918–1922

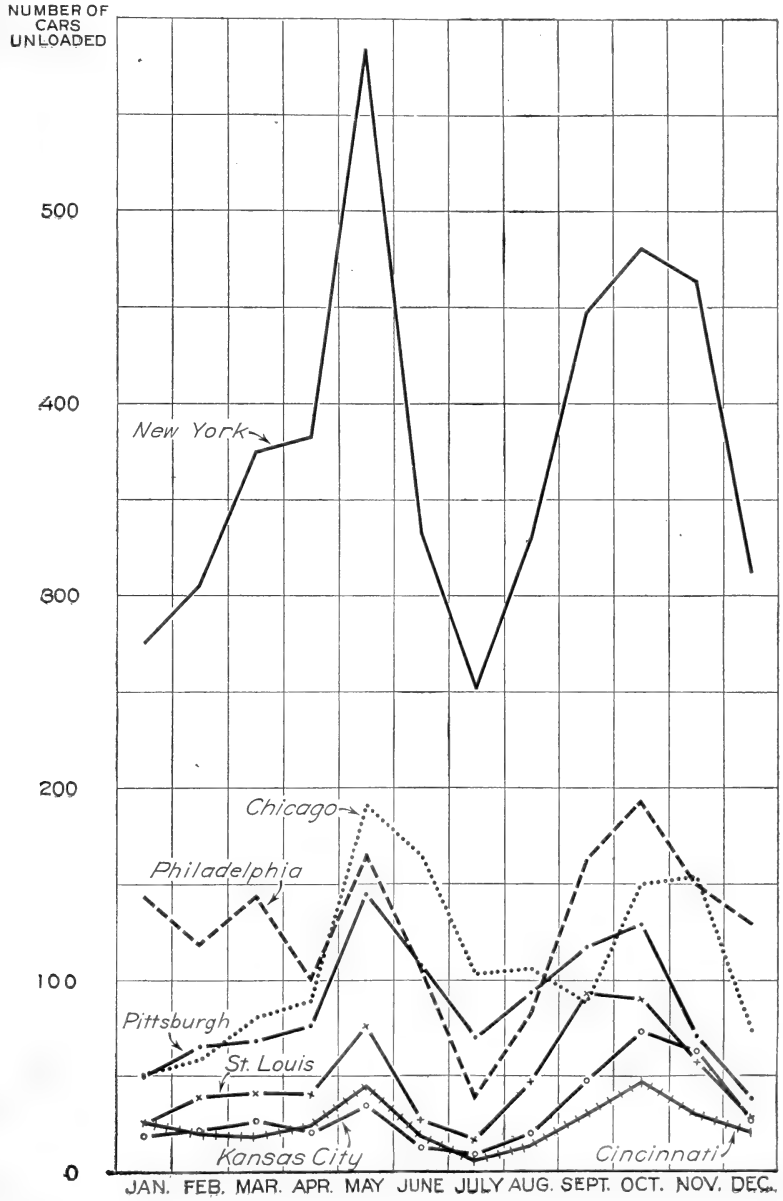

FIG. 27.—Peaks of monthly supply occur in May and October in most cities. New York unloads nearly three times as many cars as the next largest market shown, Philadelphia

part of the other half goes, but no accurate information is at hand regarding the final destination of half of the onion crop. Figure 28 shows the relationship between unloads, shipments from producing sections, and reported production. Tables 9, 10, 11, 12, and 13 also give data on these features of the onion industry.

PRICE TENDENCIES

As the demand for onions in city markets continues about the same, the markets respond emphatically to a supply that is much above or below normal volume for any great length of time (fig. 29). As the product is not quickly perishable, the change in price often does not appear until the week following a time of especially light

ESTIMATED COMMERCIAL ONION PRODUCTION IN THE UNITED STATES WITH ANNUAL CAR-LOT SHIPMENTS, CAR-LOT UNLOADS IN 12 CITIES, AND IMPORTS FROM ALL SOURCES, SEASONS 1918–19 TO 1922–23

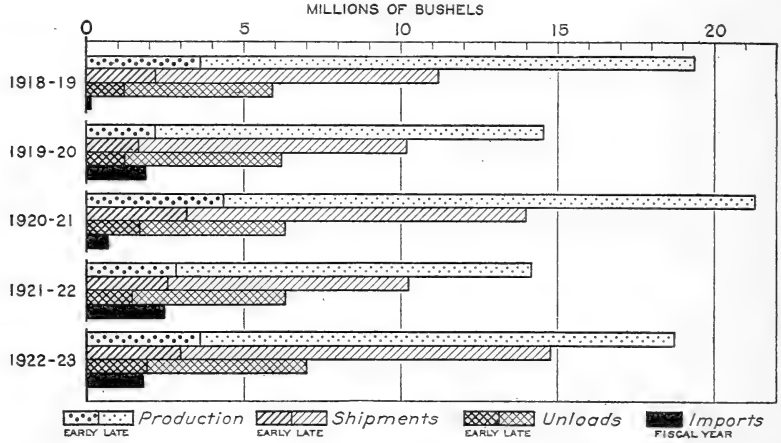

FIG. 28.—Shipments vary somewhat according to estimated production, but the total of cars unloaded in 12 great market centers varies comparatively little from season to season. Imports increase in the short crop seasons

or heavy receipts. A heavy supply several weeks in succession may start a downward price movement lasting for some time if the season's general trend is downward, but with quick recovery if the general trend is upward.

The great markets all follow the same general course, but time and extent of temporary price changes vary according to local supply. The New York market shows the most direct response to volume of car-lot supply and is more or less the index market.

BERMUDA SUPPLY AND PRICES

Market seasons of domestic Bermuda onions are much alike in a few usual and general features, including the early high prices, rapid decline, and then a fairly steady or slightly downward trend, as in Figure 29, often with a brief upward turn at or near the season's end. The result of increasing supplies shows strongly in

the early price trend, but the fairly good keeping quality of much of the stock tends to steady the market considerably after the first month. The chart of prices and arrivals shows in midseason of 1921 comparatively slight responses of price to sharp changes in new supply.

The general price trend of the domestic Bermuda market in 1922 was downward, with sharp declines at New York during weekly receipts of 200 cars and a temporary recovery when receipts fell to

WEEKLY CAR-LOT ARRIVALS AND PRICES TO JOBBERS OF TEXAS YELLOW BERMUDAS AT NEW YORK AND CHICAGO, 1921 TO 1923

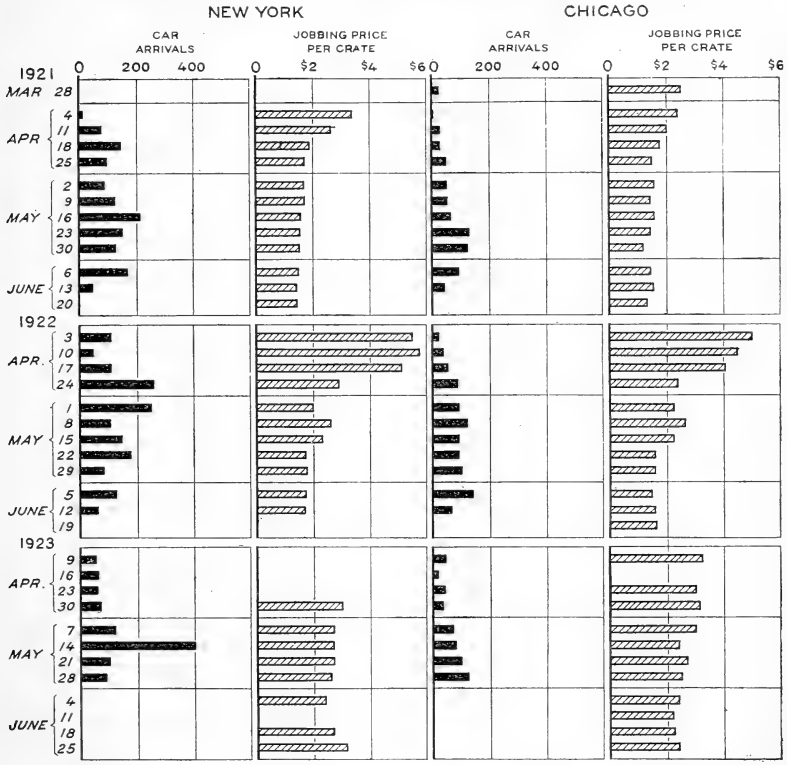

FIG. 29.—Onion prices show some degree of correspondence with current supply

about 100 cars the first week of May. The behavior of the domestic Bermuda market was much the same in Pittsburgh and Chicago. In 1923, after the usual high early level in April the market moved within a narrow range without special feature. In 1924 the market was upset by the low-priced left overs of the northern crop and remained somewhat dull and depressed throughout the season.

RECENT MAIN-CROP SEASONS

During the seven seasons of 1917–18 to 1923–24, inclusive, years of prevailing high prices usually followed the years when the bulk of the crop sold at low prices. In 1917–18, following the onion fam-

ine of the spring of 1917, main-crop onions in city markets opened at $2.50 to $3.50 per 100 pounds, but with a fairly large crop in sight declined steadily from October to the end of the season, reaching 75 cents to $1 in April.

The course of prices during the season of 1918–19 was the reverse of the preceding season and tended upward from an opening range of 25 to 75 cents per 100 pounds to high points of $4.50 to $7.50 in the late spring, when the stoppage of imports increased the spring shortage.

War conditions and light general supply in 1919–20 tended to raise the level of prices throughout the season, which opened at $3 to $4, fluctuated between $3 and $5 during the main part of the season, and rose at the end to over $6.

The trend of prices was steadily downward during 1920–21, owing to heavy production and in line with the postwar declines, which

AVERAGE PRICES OF EASTERN YELLOW ONIONS IN LEADING CONSUMING CENTERS—NEW YORK, BOSTON, PHILADELPHIA, AND BALTIMORE

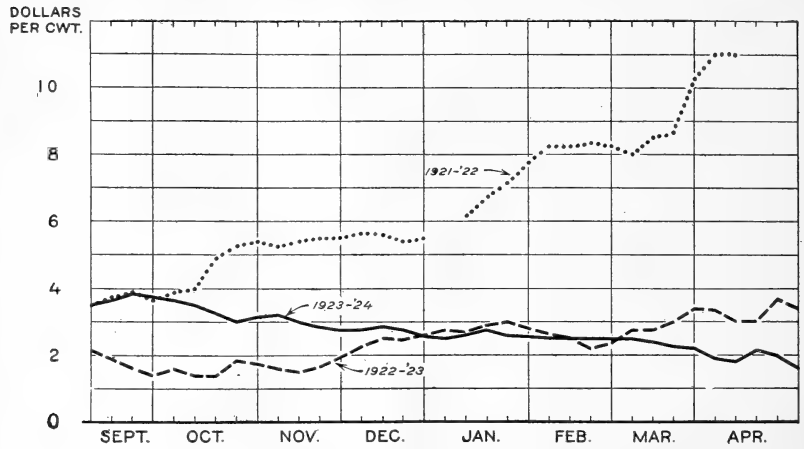

FIG. 30.—Except in short crop years price variations are moderate

affected most farm products. The early range was from $1.50 to $3. Not much stock sold above $2. The price soon declined to $1, and fell even lower at times during the spring of 1921.

The usual rebound from the preceding season occurred in 1921–22. Shipments were almost as light as those of two seasons before and prices exceeded war-time heights, reaching $9 to $12 in April, having risen from fall prices around $3 per 100 pounds. Unusually heavy imports in the fall of 1921 were due in part to the shortage of large domestic onions. Figure 30 indicates the trend of eastern yellow stock in city markets for the seasons 1921–22 to 1923–24.

In 1922–23 there was the extraordinary combination of prices advancing from low points to fairly high levels, despite a rather large production and liberal shipments, a situation partly explained by the reduced imports. The price rose from $1.50 to $2 in the early fall to $3 in January and closed the season around $4.

In 1923–24, although the crop was estimated to be somewhat lighter, supplies were large and the price followed about the same general level as in the season before. A range of $2 to $3 per 100 pounds covered most sales of yellow onions in the cities, although very low prices were recorded near the end of the season. Red onions were scarce and sold at $3 to $4.

The course of these seven market seasons shows the general tendency for high prices to alternate with low prices. The need of watching all conditions is shown by the inflation of prices in wartimes, the effect of prosperity or hard times on consumption, and the apparent influence of tariff changes on supply and price. In 1918 and again in 1921 the relative scarcity of large stock suitable for storage tended to depress prices in the fall and to raise prices later in the season. In 1922 the inferiority of the eastern crop and the consequent dependence on the West for much of the supply brought about higher prices, especially in eastern markets. A crop of inferior quality in a commercial area limits the marketable supply and tends to raise the price. Data on prices of onions to jobbers, by varieties, are given in detail in Tables 14, 15, and 16.

FORECASTING THE MARKET

During the seven seasons under consideration it would have been fairly safe to predict high prices for both early and late onions in a season following a year of heavy production and low prices. A short crop, with a total shipping movement of 20,000 cars (Table 10) twice in this period has been followed by a heavy season with a movement of approximately 30,000 cars, as compared with the five-year average of 24,000. Yet during the past 10 years there have been instances of two light years or two heavy years in succession.

The southern grower especially should study the reports of crop conditions and stocks in storage in competing sections, both domestic and foreign, the quantity and quality of the old northern stock suitable for storage, and the probable condition of business and general prosperity at the season of marketing.

The northern grower is less affected by foreign-crop conditions, and the southern crop is a matter of concern chiefly to the comparatively small number of commercial growers who store their own onions. At planting time, about the only indication available is from reports of the southern acreage. The reports of intended planting in other northern sections should be noted; although sometimes, as in 1923, a large yield per acre may offset a smaller acreage.

The early official estimates of late-crop production are of some value to southern planters whose plans are influenced by the probable supply of northern stock on the spring markets. The average estimated annual production in 16 main-crop States (Table 12) for the five seasons 1918 to 1922 inclusive was about 13,000,000 bushels. If the main crop is much below this average, storage supplies are likely to be low, followed by an early clean up and a shortage in the late spring. Poor storage quality of a crop average may result in a light supply in late spring.

MARKET INFORMATION

Crop and market information is sent out by the Department of Agriculture at Washington and from its market stations at New York, Boston, Philadelphia, Baltimore, Pittsburgh, Chicago, Cincinnati, Minneapolis, St. Louis, Kansas City, Denver, Fort Worth, Salt Lake City, San Francisco, Los Angeles, Portland, and Atlanta, and during the active local shipping season from temporary field stations at Laredo, Tex.; Grand Rapids, Mich.; and Rochester, N. Y. News from several other shipping points is collected and given out by the nearest market stations. The information, gathered by market reporters (fig. 31) is issued in daily or semiweekly market reports, weekly reviews and summaries, semimonthly crop notes,

FIG. 31.—Market reporters base wholesale price quotations on daily sales of jobbing lots

monthly crop estimates, and estimates of stock in storage. Detailed reports of car-lot shipments and of arrivals at city markets are included in the daily market reports from Washington, in the weekly carlot summary, and in Crops and Markets, a weekly periodical issued from Washington by the Department of Agriculture. These various publications, kept in convenient form for reference and comparison, enable the grower, shipper, and dealer to keep in touch with developments in the onion market.

For the early crop the important news is that which concerns the yield, earliness, and condition of the Texas crop; the volume of shipments; the price of commercial grade Yellow Bermudas at such markets as New York, Pittsburgh, Chicago, Kansas City, and St. Louis; the supply and price of old storage stock, and the expected arrivals of foreign onions.

For the grower of late onions, the most important crop and shipment news comes from the leading main-crop sections, such as Western New York, the Connecticut Valley, central California, Hardin County, Ohio, and the Walkerton district, Ind. The leading market grade is generally the Yellow Globe U. S. No. 1 or, in Kansas City and St. Louis, the Red Globe.

Even with the general situation forecasted correctly, the element of uncertainty remains, because of unforeseen and uncontrollable conditions affecting whole districts or whole regions, such as railroad tie-ups, car shortage, scarcity of labor, storms, floods, and insect invasions. No crop grower can be right always, but fortune more often favors those who have made the best use of available information.

COST OF MARKETING

The final price paid by the consumer to the retailer for any product includes compensation for a variety of services other than actual production. Each of the agencies whose services are required in distribution must be reimbursed for expenses incurred and if efficient should also receive a certain margin of profit. The country dealer who assembles and ships the onions; the wholesaler who receives and sells in car lots, or in smaller units to jobbers; the jobber who supplies the retail trade in quantities from one package up, are each subject to certain expenditures in operation. These may include grading, packing, transportation, storage, labor for handling, and space for display, as well as the risk incident to ownership, especially during a season of falling prices. Frequently it is necessary for the dealer to take a loss in order to move some stock, and this loss must be covered by returns from more successful operations. The retailer is responsible for choice of the right grade and type of stock for his particular trade; if he guesses wrong or pays too high a price or overstocks on a falling market, he must suffer temporarily until more fortunate judgment enables him to recover. In addition, certain indirect expenses such as rent for land and buildings, salary to the dealer as well as to his employees, and allowance for interest and a "reasonable return" on the capital invested are to be considered.

Each of these factors varies in importance according to season and crop, business conditions, local habits of the buying public, and numerous other influences, and each must be considered before the amount charged by any agency can be judged fair and adequate. The services of the agencies of distribution are in general necessary to insure the orderly marketing of agricultural products, and it is important that their respective returns should be large enough to attract a sufficient number of dealers to insure that the various functions are efficiently performed.

Results from a study of prices of onions shipped from the Connecticut Valley and sold in the retail markets of Boston from August, 1920, to September, 1921, made by the Massachusetts State Department of Agriculture, are summarized in the chart (fig. 32) showing the average portions of the consumer's dollar retained by each middleman and by the grower. The bar on the right in Figure

33 shows the grower's, the country dealer's, and the transportation margins of the same data as in Figure 32, but divided on the basis of the wholesaler's dollar so as to be comparable with the information on Texas onions.

The margins on Texas Yellow Bermuda onions (commercial pack) for six consecutive years, 1917 to 1922, inclusive, are shown in Figure 33. These margins were computed from prices collected by the Bureau of Agricultural Economics of the Department of Agriculture. This chart differs from Figure 32 in that the division is made on the basis of the dollar paid by the Boston wholesaler who purchased the onions from the country dealer. Attention is called to the fact that in 1922 the country dealer's margin averaged zero and thus has no place in the graph. These dealers as a class not only failed to make money in 1922, but appear to have lost everything in the way of expenses.

DIVISION OF THE CONSUMER'S DOLLAR—CONNECTICUT VALLEY ONIONS, BOSTON RETAIL SELLING PRICES, 1920–21

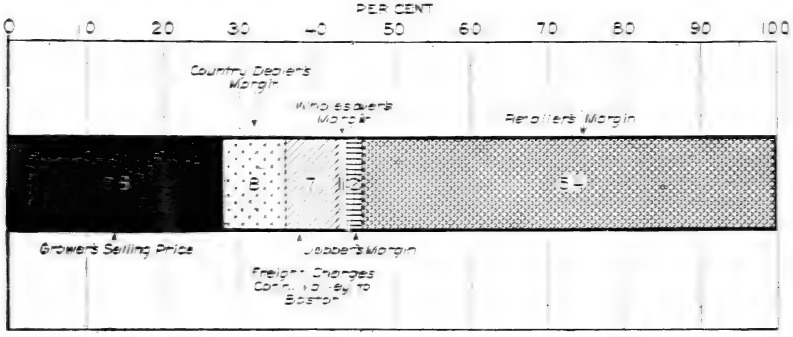

FIG. 33.—Cost of marketing takes heavy toll even from nearby shipments

Retail prices on Texas Bermuda onions were not available, making it impossible to carry their analysis through to the consumer.

IMPORTS

Imports constituted about 10 per cent of the total shipped-in supply from 1918 to 1922, and about 7 per cent of the domestic commercial crop. They offer some competition to the early crop and compete with the main crop in seasons of light domestic production. They differ somewhat from domestic stock in appearance and quality and are not acceptable to all classes of trade; and in some of the city markets, especially those of the West, they do not greatly affect prices of the domestic stock.

Imports from Spain and Egypt, some of them direct and some through English ports, are of chief importance, as they form the bulk of receipts (fig. 34). Liberal imports from Holland were an unusual feature of the 1923 season. Bermuda, formerly the chief source of early imports, now ships only a few thousand bushels, mostly grown from California seed, and ranks with Italy, Chile, Mexico, and other lesser sources of supply. About half the average

imports of onions come to the United States during the last four months of the year; but following some seasons of domestic shortage, as in 1919 and 1921, the imports began early and continued large throughout the winter and spring.

MARGINS ON TEXAS BERMUDAS, 1917 TO 1922, AND ON CONNECTICUT VALLEY ONIONS 1920–21, BOSTON WHOLESALE SELLING PRICES

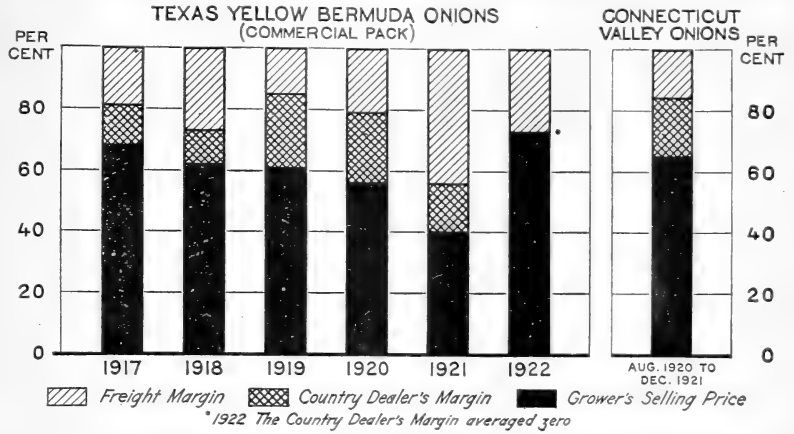

FIG. 33.—The proportion of freight cost and dealer's margin vary greatly according to market conditions; the lower the price and the longer the distance, the greater is the usual proportion of freight cost and dealer's margin

IMPORTS OF ONIONS TO THE UNITED STATES BY COUNTRIES, 1918–1922

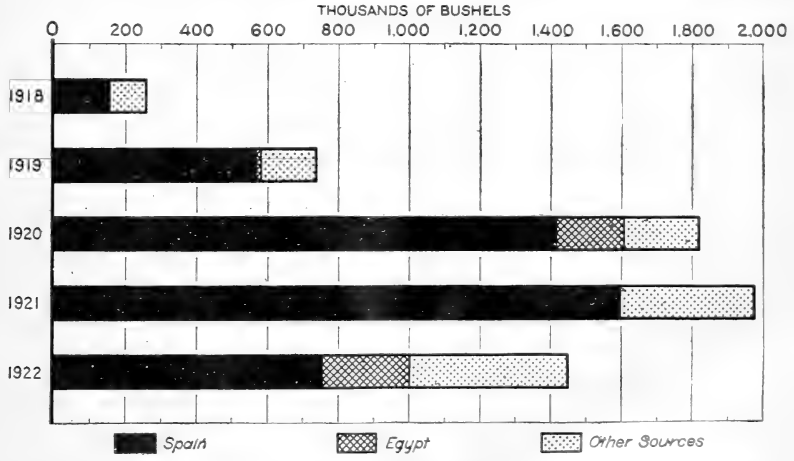

FIG. 34.—Spanish onions constitute four-fifths the average imports, but other lines are increasing

SPANISH ONIONS

About four-fifths of the average total onion imports to the United States are from Spain, and the United States ranks next to Great Britain as a market for Spanish onions. Imports from Spain come

mostly from two Mediterranean points—Valencia and Denia. Although commonly spoken of as the Valencia, many of the oval, yellow Spanish onions coming into this country are from the Denia district.

The main onion season in Spain is not very different from that of the main crop in the United States. Harvesting of the principal variety, an oval-shaped kind, golden yellow in color, begins in July, and shipments, partly from storage, continue about eight months. This variety is a good keeper. The large, flat, white spring variety

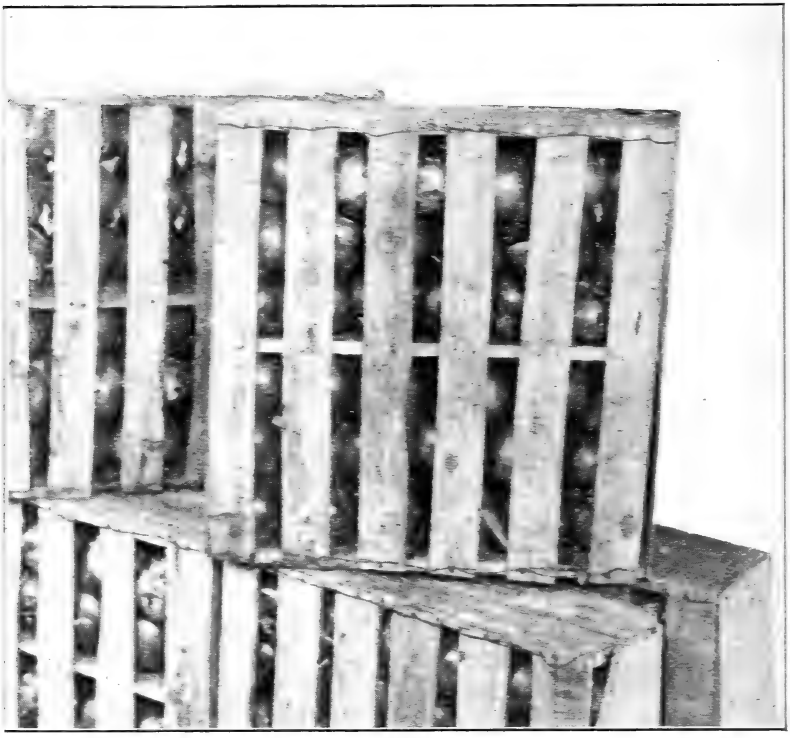

FIG. 7.—Spanish onions for the American markets are packed mostly in crates

from the Valencia district is marketed in spring and early summer, but is too poor in keeping quality for distant marketing and constitutes only about 5 per cent of the imports to the United States from Spain. The imports come whenever conditions favor. A light main crop here is likely to be followed by large fall or winter imports, as in 1918–19 and 1921–22, and Spanish stock is available almost throughout the year whenever the price is high enough to overcome the handicaps of freight at more than $1 per crate and tariff of 1 cent per pound. Details of imports for the five-year period, 1918–1922, are shown in Tables 17 to 19, inclusive (pp. 67 to 68).

The usual packages for imported onions are cases containing 125 to 130 pounds (2.33 bushels), or crates (fig. 35) holding 37 to 40 pounds (0.77 bushel). A half-case package is offered occasionally.

New York is the chief center of distribution. Methods of sale do not differ from those for other onions except that about 20 per cent is sold at auction. Most of the imports not reshipped to receivers and jobbers in other cities are sold by the importing receivers to local jobbers and resold to retailers.

New York receives and distributes about 86 per cent of the average imports. Boston handles half the others. Of six remaining import districts none exceeds 2.1 per cent. Boston and San Francisco seem to be increasing in importance. In 1922 San Francisco stood next to New York and Boston, gaining apparently at the expense of several eastern ports.

EGYPTIAN ONIONS

In former years the price of Egyptian imports usually has compared favorably with domestic onions. The trade does not want much of the Egyptian stock, claiming it is too hard and too strong, as well as too large in many instances; hence the markets are sometimes oversupplied, and the surplus becomes almost unsalable.

The export onions are mostly from upper Egypt, and are of the red Spanish type. The crop is planted in September, transplanted in November or December, and is ready for export in March.

Texas onion growers watch the Egyptian crop with some interest because of its competing season. The average production is far greater than the onion crop of the United States, but only the equivalent of about 4,000 cars are exported in a normal year. Nearly one-fourth of that quantity came to the United States in the spring and summer of 1923.

EXPORTS

For the five years 1918 to 1922, inclusive, onion exports from the United States averaged about 827,000 bushels per year. The total did not vary by more than one-third from least to greatest yearly volume, but when figures by seasons (export year beginning May 1, see Table 20) are compared, it is shown that exports tend to increase following a large crop. (See fig. 36.) Sales have been mostly to countries of the Americas. (Table 21.) Cuba averaged about half and Canada one-quarter of our exports. The remaining quarter is divided among South and Central American countries, Mexico, and the West Indies, with about 6 per cent taken for New Zealand, Australia, and miscellaneous destinations. Trade seems to be decreasing with South America and increasing with Central America, the West Indies, and New Zealand. Most of the net gain in exports since 1916 is represented by the increased shipments to Cuba.

Onions in considerable quantity are forwarded from New Orleans to the West Indies and Central America. These shipments usually go in slat crates.

Average exports are equal to about two-thirds the average volume of imports and are chiefly to different countries. Canada ships about 40 cars of late onions and takes 4[illegible] cars, mainly early stock, whereas Australia sells us more onions than it buys.

SUMMARY

Onions probably stand fifth among the vegetables in estimated value of acreage harvested. According to the 1920 census figures, tomatoes followed white and sweet potatoes, with cabbage next. Features of development in the industry are: The increasing concentration of production in small areas; the expansion of acreage in certain established sections; the increase of commercial storage; and the increasing prominence of some of the newer producing areas, particularly in Texas and California, the Middle West, and the Northwest.

For commercial purposes, onions are classed as early or southern (Bermudas and Creoles), and late, main crop, or northern. For the early crop the large, mild foreign types and varieties, mostly those known as domestic Bermudas, are grown. These are trans-

UNITED STATES IMPORTS AND EXPORTS OF ONIONS, SEASONS 1918–19 TO 1922–23 (EXPORT YEARS BEGINNING MAY 1, IMPORT YEARS BEGINNING JULY 1)

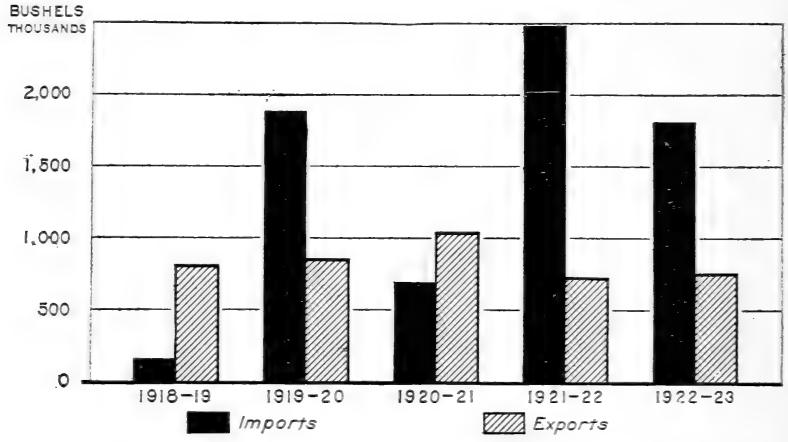

FIG. 36.—Imports tend to increase, but are much less in seasons of full production here. Exports average about two-thirds of the total imports

planted from seed beds, most of them are grown under irrigation, marketed in spring and early summer, shipped and sold in crates, and not put in storage for long periods.

The late onions are mainly the smaller yellow or red globe-shaped kinds; they are grown direct from seed or from sets; are not commonly irrigated; are harvested in late summer and fall, and are shipped and marketed as sacked stock. Much of the late crop is stored before shipment for distribution.

The bulk of the early crop, which is nearly one-fifth of the total crop, is grown in the Rio Grande Valley of Texas and in southern California. The main northern crop is grown by intensive culture on valley soils or reclaimed muck land. New York, Massachusetts, Ohio, and Indiana produce more than half the main crop. Nearly three-fourths of the combined early and late supply of onions is grown in the six States mentioned.

The onions are dug or pulled, dried, screened, cleaned, sorted, and usually graded. The early crop is shipped in 1-bushel crates soon after harvesting. The late crop is shipped in 100-pound sacks after a longer or shorter period of curing and storage.

Most growers sell to local buyers who distribute through city dealers. From one-fourth to one-half of the main commercial crop goes into farm or commercial storage. Many growers are financed by loans, credit, or advance payment by dealers.

The early shipping season, April to June, is at its height in May. The late season movement, beginning in July, reaches its height in September and October, and continues from storage until June. Usually more than half the main crop is shipped before December. A dozen great city market districts take half of the car-lot shipments.

High prices tend to alternate with low prices in successive seasons, corresponding with like variation in production. Quality of the crop, the probable imports, and the general business outlook all have a part in a forecast of the market. Crop and market information is supplied free in many forms by the Department of Agriculture.

TABLE 1.—*Features of the commercial early crop in leading States*

State	Leading varieties	Average yield per acre	Production, 5-year average	Shipments, 5-year average	Leading counties	Leading shipping stations	Active harvest season
		Bushels	*1,000 Bushels*	*Cars*			
Texas	Yellow Bermuda, Crystal Wax.	218	2,469	4,075	Dimmitt	Asherton, Big Wells.	Mar. 20–June 10.
						Carrizo Springs.	Do.
					Webb	Laredo	Do.
					Zavalla	Crystal City	Do.
					La Salle	Cotulla	Do.
California	Yellow Bermuda, Crystal Wax	302	631	805	Riverside	Coachella	Apr. 15–June 20.
						Thermal	
						Indio	Do.
							Do.
					Imperial	Brawley	Do.
						Imperial	Do.

State	Growers' usual basis of sale	Usual buyers	Dealers' usual basis of sale	How put up	Leading markets	Shipping season
Texas	Cash per crate or as per contract.	Local dealers, agents, and contract buyers.	F.o.b. usual terms and cash track.	Standard 1-bushel crate.	New York, Boston, Chicago, Philadelphia, Pittsburgh, St. Louis.	Mar. 15–June 15.
California	Cash per crate at shipping station or as per contract.	do	do	do	Chicago, New York, Boston.	Apr. 20–June 30.

TABLE 2.—*Features of the commercial main crop in leading States*

State	Leading varieties	Average yield per acre	Production 5-year average	Shipments 5-year average	Leading counties	Leading shipping stations	Active harvest season
		Bushels	*1,000 Bushels*	*Cars*			
California	Australian Brown, White Globe, Yellow Danvers.	305	2,337	3,408	San Joaquin	Stockton	May 15–Nov. 15.
					Sacramento	Sacramento	Do.
New York	Yellow Globe, Red Globe.	315	2,598	2,856	Orange	Orange Farm, Pine Island, Florida.	July 20–Oct. 25.
					Wayne	Williamson and East Williamson.	Do.
					Madison	Canastota	Do.
					Genesee	Elba	Do.
Massachusetts	Yellow Danvers, Red Wethersfield, White Globe, Japanese.	364	1,676	2,738	Franklin	South Deerfield.	July 25–Oct. 31.
					Hampshire	Hadley	Do.
						Hatfield	Do.
Ohio	Yellow Globe, Southport White Globe, Red Globe.	305	1,679	2,674	Hardin	McGuffey	Aug. 1–Oct. 15.
						Alger	
Indiana	Yellow Globe, Red Globe, Portugal, Silverskin.	328	1,522	2,557	Whitley	Churubusco, Collins, Columbia City.	July 15–Oct. 30.
					Noble	Kimmell	Do.
					Starke	Knox	Do.
					Jasper	McCoysburg	Do.

State	Growers' usual basis of sale	Usual buyers	Dealers' usual basis of sale	How put up	Leading markets	Main shipping season
California	Cash per sack			100-pound sack.	Chicago, San Francisco, Los Angeles.	June 30–Apr. 30.
New York	Cash per bushel delivered.	Local dealers.	F. o. b. usual terms.	do	New York, Philadelphia.	July 20–May 31.
Massachusetts	Cash delivered	do	F. o. b. usual terms, cash track and wire sales.	do	New York, Boston, Philadelphia.	July 15–May 20.
Ohio	Cash per bushel bulk delivered.	do	Wire orders, joint account, 50 per cent consignment.	do	New York, Pittsburgh, Philadelphia, Cincinnati.	July 15–Apr. 30.
Indiana	Cash delivered	Local dealers, consignment.	Wire orders	do	New York, Chicago, Pittsburgh, St. Louis.	Do.

TABLE 3.—*Features of city wholesale markets as reported by market stations*

City	Average annual unloads 1918–1922	Principal sources of supply: States	Principal sources of supply: Estimated home-grown	Chief varieties sold	Preferences	Prejudices	Commission usually charged	Transportation to store	Distribution territory
	Cars		*Per cent*				*Per cent*		
Atlanta	[1] 133	Indiana, Ohio, California.	15 to 20	Yellow, some white.	Premium for Australian Brown.	Demand slow for red, moderate for white stock.	Usually 10	Negligible; siding at rear of produce row.	100 to 150-mile radius.
Baltimore		New York, Texas.	10	Yellow Globe, Bermuda.	Yellow stock	No demand for red stock.	5 to 7	Crates 4 cents, sacks 6 cents,	Immediate vicinity.
Boston	1,813	Massachusetts, Texas, California.	4	do	Premium usually for Connecticut Valley stock.		7 to 10	Crate 7 cents, sack 12 cents.	25 to 30-mile radius.
Buffalo	[1] 336	New York, Ohio, Indiana, Texas.	25 to 75	Yellow Globe, Japanese.	30 to 50 per cent premium for Japanese.	Against red stock	7 to 10	Sack 5 cents, crate 2½ cents.	25 to 175-mile radius.
Chicago	1,310	California, Texas, Indiana.	10	Yellow, white	20 cents per 100 pounds premium for white stock.	Against red stock, new stock in bags, and new stock boilers.	10	100 pounds 8 cents, crate 5 cents.	75-mile radius, occasional cars much farther.
Cincinnati	300	Ohio, Indiana, Texas.	Total supply for 6-week period.	Yellow, some Spanish.	Much improved demand in cold weather.	Against red stock, demand for white limited.	10	Sack, 5 cents	40-mile radius.
Cleveland	496	Ohio, Indiana, Texas, California.	September to December, 10 to 15, January to August, 5.	Yellow	Small premium for Connecticut Valley stock; increased demand in cold weather	Against red stock, boilers, stock over 3 inches, hampers and burlap sacks.	7 to 10	Sack, 4 to 5 cents; crate about 3 cents.	50 to 75-mile radius.
Denver	[1] 79	Colorado, California.	50 to 65	do	50 to 75 cents premium for fancy stock.		Less than carlots, 15 to 20, car lots, $15 to $25.	100 pounds, 4 cents	Cars of mixed vegetables to southwestern States.
Indianapolis	[1] 223	Indiana, Texas, New York.	25 to 75	do	10 to 25 per cent premium for White Wax.	None	7 to 10	Package, 5 cents	50-mile radius.
Kansas City	379	Iowa, California, Texas.	20	Red Globe, Western Yellow, Texas Bermuda.	Premium for white stock.	Louisiana Creole, poorest seller.	Car-lot brokerage, $20; jobbing commission, 10 per cent.	Most receivers have switch at warehouse.	50-mile radius, Reconsignments to adjacent States and eastern markets.
Los Angeles		California	10	White	Premium for White Globe, White Wax, and Sweet Spanish home-browns.		10 to 15, practically none consigned.	Package, 4 to 10 cents.	Sections of California, Arizona, Nevada, and Mexican border.

[1] Information available for 1923 only.

TABLE 3. *Features of city wholesale markets as reported by market stations*—Continued

City	Average annual unloads 1918–1922	Principal sources of supply: States	Principal sources of supply: Estimated home-grown	Chief varieties sold	Preferences	Prejudices	Commission usually charged	Transportation to store	Distribution territory
	Cars		*Per cent*				*Per cent*		
Milwaukee	[1] 144	California, Texas, Colorado.	75	All except red	None	Strong against red stock.	10, little consigned.	100 pounds, 2 to 3 cents.	Immediate vicinity.
Minneapolis	94	Texas, Washington, California.	30	Bermuda, Yellow Globe, red.	Premium for Spanish stock.	Little demand for boilers.	Little consigned	Usually included in selling price.	Sections of Minnesota, adjacent States and Canada.
New Orleans	[1] 483	California, Iowa Indiana.	15 to 20	Red Globe, Creole.	Indiana Red Globe 10 per cent higher.	None	10 to 15	Practically none	
New York	4,540	New York, Texas, Ohio, Indiana.	5 to 7	All kinds salable.	White boilers	None	Car lots 7, less than car lots 10.	Bag, 7 to 15 cents; crate, 7 to 10 cents.	50-mile radius.
Omaha	[1] 107	Iowa, California, New York, Washington.	5	Red, yellow	5 to 10 per cent premium for Red Globe.		$15 per car	Sack, 10 cents	100-mile radius.
Philadelphia	1,535	New York, Texas, Massachusetts.	About 10	Standard yellow.	10 to 20 per cent premium for yellow.	Very limited demand for red or pink stock.	5 to 10	Crate, 5 cents; sack, 10 cents.	Local district.
Pittsburgh	1,034	Texas, Ohio, Indiana.	Negligible	Yellow	Premium usually for California, Australian Brown.	Red stock little demand, white demand limited.	5 to 10 on new stock; little late stock consigned.	Practically none	50 to 75-mile radius.
Portland	[1] 130	California, Washington, Oregon.	About 75	do	In season White Bermuda, Stockton Yellow, Walla Walla Yellow Globe.	Red stock undesirable except in short crop seasons.	15; little consigned.	None. Hauling by purchaser.	100 miles north and west, 150 miles east and south.
Seattle	[1] 252	Washington, Oregon, California.	40	Yellow Globe, Australian Brown.	Oregon stock, and Australian Brown favored.		15	Package, 3 to 5 cents.	Local, Alaska and British Columbia.
St. Louis	481	Indiana, Texas, Iowa.	10	Red Globe	White stock, 10 to 50 percent higher.		7 to 10	Crate, 3 to 6 cents; sack, 6 cents.	200-mile radius, California and Texas stock to eastern States.
Washington	201	Ohio, New York, Texas.	5	Yellow Globe, Yellow Bermuda.	Premium for limited quantity white stock.	Red stock slightly lower in price.	10	Package, 5 to 8 cents.	20-mile radius.

[1] Information available for 1923 only.

TABLE 4.—*Annual car lot unloads at 12 cities and United States shipments*

Cities	1918	1919	1920	1921	1922	Average
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	4,465	4,801	4,072	4,429	4,933	4,540
Boston			1,867	1,797	1,776	1,813
Philadelphia	1,542	1,398	1,554	1,482	1,698	1,535
Chicago	695	1,403	1,237	1,545	1,673	1,310
Pittsburgh	1,208	976	1,115	922	951	1,034
St. Louis	549	438	687	559	672	581
Detroit	382	516	654	558	675	557
Cleveland	417	422	593	498	548	496
Kansas City	389	284	426	345	453	379
Cincinnati	276	226	283	314	400	300
Minneapolis	75	83	107	91	115	94
St. Paul	25	61	40	71	65	52
Total	[1] 10,023	[1] 10,608	12,635	12,611	13,959	[2] 12,691
United States shipments	22,027	20,874	25,950	23,318	27,563	23,946

[1] 11 cities; no figures available for Boston 1918 and 1919. [2] Includes 3-year average for Boston.

TABLE 5.—*Annual early and late car lot unloads at 12 cities and total United States shipments*

Cities	Early						Late					
	1918	1919	1920	1921	1922	Average	1918	1919	1920	1921	1922	Average
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	696	665	860	967	1,127	863	3,769	4,136	3,212	3,462	3,806	3,677
Boston			576	399	384	453			1,291	1,398	1,392	1,360
Philadelphia	274	197	403	251	374	300	1,268	1,201	1,151	1,231	1,324	1,235
Chicago	318	420	484	391	734	469	377	983	753	1,154	939	841
Pittsburgh	207	276	348	273	309	282	1,001	700	767	649	642	752
St. Louis	123	78	161	122	199	137	426	360	526	437	473	444
Detroit	87	71	134	113	175	116	295	445	520	445	500	441
Cleveland	105	100	169	116	168	132	312	322	424	382	380	364
Kansas City	56	59	84	92	92	76	333	225	342	253	361	303
Cincinnati	61	51	77	90	124	81	215	175	206	224	276	219
Minneapolis	32	37	60	24	58	42	43	46	47	67	57	52
St. Paul	8	14	11	21	36	18	17	47	29	50	29	34
Total	[1] 1,967	[1] 1,968	3,367	2,859	3,780	[2] 2,969	[1] 8,056	[1] 8,640	9,268	9,752	10,179	[2] 9,722
United States shipments	4,397	3,318	6,366	5,175	5,970	5,045	17,630	17,556	19,584	18,143	21,593	18,901

[1] 11 cities; no figures available for Boston 1918 and 1919. [2] Includes 3-year average for Boston.

TABLE 6.—*Car lot unloads at 12 cities compared with population*

City	Population of city and adjacent territory [1]	Percentage of combined total	Percentage of total United States urban population [2]	Average annual unloads 1918–22 (cars)	Equivalent in bushels (500 bushels per carload)	Per cent of unloads of 12 cities	Bushels per 1,000 population
New York	8,034,349	37.1	14.8	4,540	2,270,000	35.8	283
Chicago	3,201,301	14.7	5.9	1,310	655,000	10.3	205
Philadelphia	2,428,728	11.1	4.5	1,535	767,500	12.1	316
Boston	1,801,320	8.3	3.3	[3] 1,813	906,500	14.3	503
Pittsburgh	1,216,464	5.6	2.2	1,034	517,000	8.1	425
Detroit	1,181,057	5.4	2.1	557	278,500	4.4	236
St. Louis	1,014,457	4.7	1.9	581	290,500	4.6	286
Cleveland	951,579	4.4	1.8	496	248,000	3.9	261
Cincinnati	681,287	3.2	1.3	300	150,000	2.4	220
Minneapolis and St. Paul [4]	679,864	3.2	1.3	146	73,000	1.1	107
Kansas City	502,242	2.3	0.9	379	189,500	3.0	377
Total	21,692,648	100.0	39.9	12,691	6,345,500	100.0	292

[1] Adjacent territory includes civil divisions within 10 miles of city boundary.
[2] The total urban population of the United States including cities of 2,500 or more is 54,304,603 according to the census of 1920.
[3] Average 1920–1922.
[4] Minneapolis and St. Paul metropolitan districts interlock.

TABLE 7.—*Variations from 5-year average unloads at 11 cities and total annual shipments to all markets*

Year	Unloads at 11 cities	Variation from 5-year average		Year	Total shipments	Variation from 5-year average	
		Cars	Per cent			Cars	Per cent
5-year average	10,879			5-year average	23,946		
1918	10,023	−856	−7.9	1918	22,027	−1,919	−8.0
1919	10,608	−271	−2.5	1919	20,874	−3,072	−12.8
1920	10,768	−111	−1.0	1920	25,950	+2,004	+8.4
1921	10,814	−65	−.6	1921	23,318	−628	−2.6
1922	12,183	+1,304	+12.0	1922	27,563	+3,617	+15.1

TABLE 8.—*Annual car lot unloads by principal sources of supply, 1918–1922*

Sources	1918	1919	1920	1921	1922	Total	Average	Percentage of total
New York City:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	
New York	1,652	1,729	954	1,593	991	6,919	1,384	30.5
Texas	617	435	700	875	870	3,497	699	15.4
Indiana	331	205	493	421	909	2,359	472	10.4
Ohio	538	597	439	337	806	2,717	543	12.0
Massachusetts	447	685	466	325	166	2,089	418	9.2
California	114	353	174	275	266	1,182	236	5.2
Imports	161		329	341	623	1,454	291	6.4
Miscellaneous	605	797	517	262	302	2,483	497	10.9
Total	4,465	4,801	4,072	4,429	4,933	22,700	4,540	100.0
Philadelphia:								
New York	667	474	355	424	296	2,216	443	28.9
Texas	268	163	345	219	302	1,297	259	16.9
Indiana	42	51	151	108	192	544	109	7.1
Ohio	106	129	127	78	314	754	151	9.8
Massachusetts	207	257	210	330	122	1,126	225	14.7
Imports	34	25	146	144	162	511	102	6.6
Miscellaneous	218	299	220	179	310	1,226	246	15.0
Total	1,542	1,398	1,554	1,482	1,698	7,674	1,535	100.0
Boston:[1]								
California			161	170	131	462	154	8.5
Massachusetts			798	875	567	2,240	747	41.2
Texas			417	287	299	1,003	334	18.4
Imports			206	336	261	803	268	14.8
Miscellaneous			285	129	518	932	310	17.1
Total			1,867	1,797	1,776	5,440	1,813	100.0
Chicago:								
Texas	279	306	327	284	370	1,566	313	23.9
California	125	453	206	482	462	1,728	346	26.4
Indiana	76	137	221	164	284	882	176	13.4
Washington	26	88	40	108	89	351	70	5.3
Michigan	15	39	54	62	92	262	52	4.0
New York	14	51	136	27	6	234	47	3.6
Imports	3	53	80	210	169	515	103	7.9
Miscellaneous	157	276	173	208	201	1,015	203	15.5
Total	695	1,403	1,237	1,545	1,673	6,553	1,310	100.0
Pittsburgh:								
Texas	203	196	228	240	220	1,087	217	21.0
California	52	141	132	55	106	486	97	9.4
Indiana	232	92	205	108	165	802	160	15.5
Ohio	287	199	154	131	191	962	193	18.6
Michigan	98	21	36	91	73	319	64	6.2
New York	99	84	135	92	35	445	89	8.6
Imports	34		48	18	22	122	24	2.4
Miscellaneous	203	243	177	187	139	949	190	18.3
Total	1,208	976	1,115	922	951	5,172	1,034	100.0

[1] No figures available for Boston 1918 and 1919.

TABLE 8.—*Annual car lot unloads by principal sources of supply, 1918–1922*—Con.

Sources	1918	1919	1920	1921	1922	Total	Average	Per centage of total
St. Louis:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	
Indiana	163	86	175	112	182	718	144	24.7
Texas	111	64	136	119	164	594	119	20.5
California	7	23	25	80	46	181	36	6.2
Iowa	110	64	80	41	61	356	71	12.3
Illinois	17	40	50	34	29	170	34	5.9
Ohio	33	36	60	24	72	225	45	7.7
Imports		2	30	23	24	79	16	2.7
Miscellaneous	108	123	131	126	94	582	116	20.0
Total	549	438	687	559	672	2,905	581	100.0
Kansas City:								
New York	2	10	42	28	28	110	22	5.8
Texas	49	40	54	73	62	278	55	14.7
Minnesota	47	29	23	15	64	178	36	9.4
Iowa	166	46	66	31	75	384	77	20.2
Colorado	22	14	21	32	65	154	31	8.1
California	25	71	92	74	34	296	59	15.6
Imports	4		4	8	4	20	4	1.1
Miscellaneous	74	74	124	84	121	477	95	25.1
Total	389	284	426	345	453	1,897	379	100.0
Cincinnati:								
Indiana	89	48	57	64	87	345	69	23.0
Texas	61	50	66	76	107	360	72	24.0
California		16	16	17	19	68	14	4.5
Ohio	81	76	59	93	106	415	83	27.7
Imports	4	5	37	31	38	115	23	7.7
Miscellaneous	41	31	48	33	43	196	39	13.1
Total	276	226	283	314	400	1,499	300	100.0

TABLE 9.—*Estimated acreage and production: Reported shipments and unloads at 11 cities, calendar years 1918 to 1922, inclusive*

Year	Acreage	Production [1]	Shipments	Percentage of production shipped	Unloads at 11 cities
		Cars	*Cars*		*Cars*
1918	64,453	38,770	22,027	57	10,023
1919	52,520	29,096	20,874	72	10,608
1920	64,940	42,686	25,950	61	10,768
1921	57,070	28,330	23,318	82	10,814
1922	63,290	37,526	27,563	73	12,183
Average	60,455	35,282	23,946	68	10,879

[1] Estimated on basis of 500 bushels per carload.

TABLE 10.—*Percentage of total estimated commercial production shipped in car lots—Early, late, and total crops; average of seasons 1918 to 1922, inclusive*

Season	Early			Late (including intermediate)			Total		
	Production	Shipments	Shipped in car lots	Production	Shipments	Shipped in car lots	Production	Shipments	Shipped in car lots
	Cars [1]	*Cars*	*Per cent*	*Cars* [1]	*Cars*	*Per cent*	*Cars* [1]	*Cars*	*Per cent*
1918–19	7,280	4,397	60	31,490	18,092	57	38,770	22,489	58
1919–20	4,366	3,318	76	24,730	17,152	69	29,096	20,470	70
1920–21	8,682	6,366	73	34,004	21,710	64	42,686	28,076	66
1921–22	5,744	5,175	90	22,586	15,333	68	28,330	20,508	72
1922–23	7,244	5,970	82	30,282	23,623	78	37,526	29,593	79
Average	6,664	5,045	76	28,618	19,182	67	35,282	24,227	69

[1] Estimated on basis of 500 bushels per carload.

TABLE 11.—*Total car-lot shipments, by months and calendar years 1918 to 1922, inclusive*

Month	1918	1919	1920	1921	1922	Average
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
January	901	1,488	1,368	2,038	1,724	1,504
February	1,062	1,213	1,159	1,769	1,011	1,243
March	1,023	949	999	1,724	719	1,083
April	1,799	1,189	1,938	2,511	3,065	2,104
May	2,290	2,462	4,242	2,559	2,301	2,771
June	1,141	646	607	822	997	831
July	1,177	1,844	1,090	1,482	1,695	1,446
August	1,921	1,909	1,918	2,048	2,497	2,058
September	3,075	3,522	3,675	3,361	4,603	3,647
October	4,211	2,963	4,910	2,608	5,129	3,964
November	2,410	1,702	2,918	1,248	2,185	2,092
December	1,017	987	1,186	1,148	1,677	1,203
Total	22,027	20,874	25,950	23,318	27,563	23,946

TABLE 12.—*Commercial crop acreage, production, and shipments, average of seasons 1918–1922*

State	Acreage	Production		Shipments (cars)	Percentage of crop shipped
		1,000 bushels	Cars [1]		
Early:					
California	2,104	681	1,262	805	64
Louisiana	1,145	282	464	165	36
Texas	11,906	2,469	4,938	4,075	83
Total	15,155	3,332	6,664	5,045	76
Intermediate:					
Kentucky	950	283	566	291	51
New Jersey	2,420	633	1,266	554	44
Virginia	1,013	269	538	184	34
Total	4,383	1,185	2,370	1,029	43
Late:					
California	7,647	2,337	4,674	3,408	73
Colorado	1,100	312	624	333	53
Idaho	170	78	156	51	33
Illinois	1,061	301	602	311	52
Indiana	4,550	1,522	3,044	2,557	84
Iowa	1,439	470	940	731	78
Massachusetts	4,582	1,676	3,352	2,738	82
Michigan	1,490	480	960	779	81
Minnesota	1,477	443	886	442	50
New York	8,197	2,598	5,196	2,856	55
Ohio	5,456	1,679	3,358	2,674	80
Oregon	828	251	502	214	43
Pennsylvania	324	103	206	109	52
Utah	142	64	128	49	38
Washington	1,238	448	896	655	73
Wisconsin	1,206	362	724	246	34
Total	40,917	13,124	26,248	18,153	69
Grand total	60,455	17,641	35,282	24,227	69

[1] Estimated on basis of 500 bushels per carload.

TABLE 13.—*Shipments by principal sources and shipping seasons, 1918–1922*

State	Approximate shipping season	1918–19	1919–20	1920–21	1921–22	1922–23	Average
Early:		*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
California	Apr. 20–June 30	372	341	1,174	888	1,250	805
Louisiana	Apr. 15–Dec. 15	450	101	106	79	91	165
Texas	Mar. 15–Sept. 30	3,575	2,876	5,086	4,208	4,629	4,075
Total		4,397	3,318	6,366	5,175	5,970	5,045
Intermediate:							
Kentucky	June 20–Oct. 31	195	339	303	361	257	291
New Jersey	June 15–Dec. 15	597	634	635	427	479	554
Virginia	June 15–Sept. 30	95	133	181	140	371	184
Total		887	1,106	1,119	928	1,107	1,029
Late:							
California	May 15–Apr. 30	3,655	5,068	3,228	2,697	2,391	3,408
Colorado	Sept. 1–Mar. 31	230	207	134	443	652	333
Idaho	Sept. 15–Mar. 15	10	13	30	43	161	51
Illinois	July 20–Apr. 30	334	123	360	253	487	311
Indiana	July 15–Apr. 30	1,817	1,005	3,448	1,834	4,683	2,557
Iowa	July 10–Mar. 31	968	488	870	411	918	731
Massachusetts	July 15–May 10	2,883	2,835	3,834	2,224	1,912	2,738
Michigan	Aug. 25–Apr. 30	590	224	795	417	1,867	779
Minnesota	Aug. 25–Apr. 15	822	439	276	172	500	442
New York	July 20–May 31	2,784	2,702	3,089	2,891	2,812	2,856
Ohio	July 15–Apr. 30	2,008	1,913	3,212	1,743	4,492	2,674
Oregon	Sept. 1–May 10	238	202	19	347	263	214
Pennsylvania	July 15–Apr. 15	79	118	93	140	113	109
Utah	Oct. 1–Nov. 30	1	18	7	52	170	49
Washington	July 10–Mar. 31	477	596	790	649	765	655
Wisconsin	Sept. 5–Apr. 30	309	95	406	89	330	246
Total		17,205	16,046	20,591	14,405	22,516	18,153
Grand total [1]		22,489	20,470	28,076	20,508	29,593	24,227

[1] Shipments from noncommercial States averaged 130 cars annually in addition to the above.

TABLE 14.—*Prices of eastern and midwestern yellow varieties sacked per 100 pounds, monthly, 1919–20 to 1923–24 seasons*

	Prices to jobbers						Prices f. o. b. shipping point eastern stock
	Eastern stock				Midwestern stock		
	New York	Boston	Philadelphia	Baltimore	Chicago	Cincinnati	Rochester, N. Y.
1919–20							
September	$3.00–4.00	$3.50–3.75	$3.00–4.25	$3.00–4.25	$3.25–3.50	$3.00–3.75	
October	3.00–4.00	2.75–3.75	2.75–3.75	3.00–4.10	3.25–4.50	3.75–5.00	$3.35–4.00
November	3.25–5.65	3.50–6.00	3.00–5.75	3.50–5.50	4.00–5.00	3.50–5.25	3.75–5.25
December	5.00–6.50	5.75–6.50	4.50–6.35	4.75–6.50	4.75–6.00	4.75–6.50	5.00–6.50
January	5.50–6.50	5.50–6.50	5.85–6.50	6.25–6.75	5.00–6.00	5.50–6.50	5.25–6.25
February	5.25–6.25	6.00–6.50	5.50–6.10	5.25–6.50	4.50–5.50	5.00–6.25	5.00–5.75
March	5.50–6.75	6.00–7.00	5.25–7.00	5.50–7.50	4.50–6.50	5.00–6.75	
April	5.00–7.00	6.00–6.50	5.50–6.50	5.50–6.75	5.50–6.00	7.00–7.50	
1920–21							
September	1.75–2.75	1.50–2.75	1.50–2.75	2.00–3.00	1.75–2.35	1.50–2.75	1.75–2.00
October	1.25–2.15	1.25–1.75	1.00–1.90	1.25–2.25	1.25–2.00	1.25–1.65	1.15–1.75
November	1.00–1.75	1.25–1.75	.75–1.75	1.25–1.85	1.25–1.75	1.25–1.65	1.10–1.40
December	1.00–1.50	1.25–1.75	.85–1.35	1.00–1.50	1.15–1.50	1.00–1.50	1.00–1.25
January	1.00–1.60	1.25–1.75	.75–1.65	1.00–1.90	1.00–1.25	1.25–1.40	.85–1.00
February	.75–1.25	.75–1.35	.75–1.15	1.00–1.25	.75–1.00	1.00–1.25	.75– .85
March	.50–1.25	.50–1.25	.40–1.15	.90–1.10	.75–1.25	.50–1.00	.50– .70
April	.50–1.90	.60–1.00	.50–1.50	1.00–1.50	.60–1.25		

TABLE 14.—*Prices of eastern and midwestern yellow varieties sacked per 100 pounds, monthly, 1919–20 to 1923–24 seasons*—Continued

	Prices to jobbers						Prices f. o. b. shipping point eastern stock
	Eastern stock				Midwestern stock		
	New York	Boston	Philadelphia	Baltimore	Chicago	Cincinnati	Rochester, N. Y.
							Connecticut valley
1921–22							
September	$3.00–4.00	$3.50–4.25	$3.15–4.75	$3.50–3.85	$3.00–3.75	$2.75–4.25	$3.25–3.75
October	4.25–6.00	3.50–5.50	3.50–5.50	----------	3.50–4.50	4.00–6.00	3.75–5.25
November	5.25–5.75	5.00–6.00	4.75–5.75	5.25–5.75	4.00–4.50	5.25–5.75	5.00–5.50
December	5.00–5.65	5.50–5.75	5.00–6.50	5.25–5.75	5.00–5.50	5.25–5.75	5.00–5.50
January	6.50–8.25	6.50–8.00	6.25–7.75	5.75–7.25	6.50–7.25	6.50–8.25	6.25–8.00
February	8.00–8.40	8.25–8.50	7.75–8.50	8.00–8.65	6.75–7.50	8.00–8.50	8.00–8.50
March	8.25–12.00	8.00–11.00	8.25–11.50	8.00–10.00	6.75–8.00	7.75–9.00	7.75–8.50
April	11.00–12.50	11.50–12.50	9.50–11.50	10.00	[1] 10.00	10.00–11.00	----------
1922–23							
September	1.40–2.00	1.25–2.50	1.40–2.25	1.40–1.75	1.25–2.00	1.25–1.65	1.00–2.00
October	1.25–2.00	1.50–1.65	1.15–1.85	1.50–1.75	1.25–2.00	1.40–1.75	1.10–1.25
November	1.25–2.25	[1] 1.75–2.25	1.50–2.15	1.75–2.00	1.50–2.00	1.50–2.00	1.15–1.40
December	2.00–3.00	2.25–2.50	2.00–3.00	2.50–2.75	2.00–2.75	2.00–3.25	1.80–2.25
January	2.50–3.00	2.50–3.25	2.40–3.00	2.75–3.25	2.40–3.00	2.75–3.25	----------
February	2.25–2.90	2.00–2.75	2.00–2.90	2.25–2.75	2.50–2.75	2.75–3.00	----------
March	2.75–4.25	2.25–3.75	2.50–4.00	2.50–4.00	2.50–3.75	3.00–5.00	----------
April	2.75–3.50	2.00–3.25	2.50–4.25	3.00–4.50	3.50–3.75	4.00–5.00	----------
1923–24							
September	3.00–3.50	3.50–4.00	3.50–3.90	3.50–3.75	3.00–3.25	3.25–3.50	3.00–3.35
October	3.00–3.75	3.00–3.75	3.00–3.40	3.00–3.50	2.50–3.25	2.75–3.25	2.50–3.00
November	2.50–3.00	2.50–3.25	2.75–3.00	3.00–3.25	2.50–3.00	2.50–3.00	2.50–2.75
December	2.25–2.90	2.25–3.00	2.25–3.00	2.75–3.00	2.00–2.75	2.25–3.00	2.00–2.40
January	2.25–2.75	2.25–3.00	2.40–3.00	2.50–2.75	2.50–2.75	2.25–2.75	2.25–2.50
February	2.25–2.75	2.00–2.75	2.00–2.50	2.50–2.75	2.25–2.50	2.00–2.75	----------
March	1.75–2.50	2.25–2.50	2.00–2.50	2.00–2.75	2.00–2.50	1.75–2.25	----------
April	1.50–2.50	1.50–2.00	1.50–2.25	1.75–2.25	2.00–2.50	2.00–2.25	----------

[1] Washington stock. [2] Midwestern stock.

TABLE 15.—*Spanish Valencias—Prices to jobbers per crate of 37 to 40 pounds, monthly, for seasons 1921–22 to 1923–24, inclusive*

Month	Boston	Philadelphia	Pittsburgh	Cincinnati	Chicago	St. Louis
1921–22						
August	$1.75–2.00	----------	$2.00–2.15	$2.00–2.25	$1.85–2.00	$2.00–2.25
September	1.50–1.75	$1.25–1.50	1.75–2.00	1.75–2.00	2.00–2.25	2.00–2.25
October	1.75	1.00–2.00	2.00–2.25	2.10–2.25	2.00–2.25	2.00–2.25
November	[1] 5.00–6.00	1.25–1.75	2.00–2.15	2.15–2.25	1.90–2.25	2.00–2.25
December	[1] 5.00–6.00	1.75–2.00	1.75–2.00	1.75–1.90	1.75–2.00	2.00–2.25
January	[1] 6.00–8.00	2.75	2.15–2.50	3.35	2.10–2.75	2.75–3.50
February	[1] 8.00–8.50	2.50–2.75	3.50–3.75	----------	3.00–3.75	3.50–4.25
March	[1] 8.00–8.00	2.75–3.00	3.65–4.00	----------	[2] 9.00–11.50	4.00–4.25
1922–23						
August	[1] 3.50–5.00	1.00	1.25–1.35	1.00–1.35	1.00–1.50	1.75
September	1.25–1.75	1.75	----------	1.65–1.75	1.75–2.50	1.85
October	1.25–1.50	1.40–1.75	----------	1.85	1.75–2.35	1.90–2.15
November	1.40–1.50	1.50–1.65	----------	1.65–1.85	1.50–2.00	1.90
December	1.40–1.50	1.25–1.50	1.40–1.65	1.65–1.85	1.50–1.75	----------
January	1.25–1.50	1.10–1.35	1.35–1.50	1.65–1.75	1.50–1.75	----------
February	1.25–1.35	1.25	1.25–1.60	1.55–1.75	1.50–1.65	1.75
March	[1] 3.50–5.00	----------	1.40–1.75	1.75	1.50–1.90	1.90–2.00
1923–24						
August	1.00–1.35	1.10–1.35	----------	1.40–1.75	1.25–1.85	----------
September	1.00–2.00	2.00	----------	1.75–1.85	1.50–2.25	----------
October	[1] 4.75–5.00	2.00–2.25	2.75	2.25–2.50	2.50–3.00	2.40–2.50
November	[1] 4.50–5.00	1.75–2.50	2.15–2.40	2.00–2.50	2.00–2.65	2.40–2.50
December	1.50–1.85	1.50–2.00	2.25	1.75–2.25	1.75–2.25	2.15–2.50
January	[1] 4.25–4.50	1.75–2.25	1.50–2.00	2.25–2.50	2.00–2.35	----------
February	----------	1.50–2.25	2.00–2.25	2.00–2.50	1.75–2.25	----------
March	1.65–2.00	1.65–2.25	2.00–2.25	2.00–2.50	2.25–2.75	2.25–2.65

[1] Cases.

TABLE 16.—*Onions—Prices of Texas Yellow Bermudas, per crate, 1920 to 1924 seasons*

	Prices to jobbers						Prices f. o. b. shipping point, Laredo, Tex.
	New York	Boston	Chicago	Philadelphia	Pittsburgh	St. Louis	
1920							
April	$5.50–7.50	$5.00–6.00	$4.25–5.25	$5.00–7.00	$4.00–7.00	$3.25–4.50	$2.00–3.75
May	2.00–4.75	2.25–4.50	2.00–3.50	2.00–3.75	2.00–3.75	1.75–3.25	1.25–2.35
June	1.00–1.50	1.00–2.00	1.00–1.50	1.00–1.90	.75–1.25	.75–1.75	
1921							
April	1.60–3.25	1.75–3.50	1.50–2.50	1.75–2.75	1.75–2.75	1.50–2.25	1.00–1.60
May	1.50–1.75	1.50–2.00	1.40–1.65	1.50–1.75	1.50–1.85	1.25–1.65	.65–1.00
June	1.25–1.65	1.50–1.75	1.00–1.50	1.15–1.60	1.25–1.50	1.00–1.75	
1922							
April	2.25–5.50	2.75–5.50	2.00–5.00	2.50–5.50	2.00–5.75	1.75–5.00	1.25–4.00
May	1.65–2.50	1.50–2.65	1.40–2.50	1.50–2.50	1.75–2.75	1.25–2.00	1.75–2.50
June	1.60–2.50	1.50–2.25	1.50–1.75	1.65–2.25	1.00–1.50	1.25–2.00	
1923							
April	2.75–3.25	3.50–4.50	3.00–3.50	3.00–3.75	3.00–4.00	2.40–3.00	2.10–2.75
May	2.50–3.00	2.50–3.25	2.35–3.50	2.25–3.40	2.50–3.00	2.50–3.00	1.50–2.50
June	2.25–3.00	2.00–2.50	2.00–2.50	2.25–2.85	2.25–2.75	1.75–2.50	
1924							
April	1.75–2.75	2.25–4.00	2.00–3.75	2.00–3.00	2.25–3.75	1.75–3.00	1.00–2.25
May	1.50–2.00	1.75–2.00	1.50–2.00	1.50–2.00	1.65–2.00	1.25–1.75	.90–1.10
June	1.25–1.75	1.65–1.75	1.50–2.00	1.50–2.00	1.50–1.75	1.25–1.50	

TABLE 17.—*Imports to the United States, by countries, calendar years 1918 to 1922, inclusive*

Country	1918	1919	1920	1921	1922	Total	Average
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Australia	5,280	4,431	24,414	1,656	119,389	155,170	31,034
Bermuda	83,121	94,796	74,345	19,849	33,593	305,704	61,141
Canada	8,475	26,328	8,712	55,168	17,544	116,227	23,245
Canary Islands	2,440	8,949	27,571	12,939	11,631	63,530	12,706
Egypt		10,486	189,108		248,544	448,138	89,628
Italy	487	7,492	19,894	67,318	10,420	105,611	21,122
Spain	153,558	568,540	1,414,910	1,596,190	752,635	4,485,833	897,167
New Zealand			176	845	11,740	12,761	2,552
United Kingdom		13,264	54,749	176,954	109,346	354,313	70,863
Other countries	7,668	6,400	5,279	45,164	135,456	199,967	39,993
Total	261,029	740,686	1,819,158	1,976,083	1,450,298	6,247,254	1,249,451

TABLE 18.—*Imports to the United States, by customs districts, calendar years 1918 to 1922, inclusive*

District	1918	1919	1920	1921	1922	Total	Average
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Massachusetts	487	25,987	149,629	117,275	148,812	442,190	88,438
New York	243,561	669,172	1,590,741	1,776,585	1,102,871	5,382,930	1,076,586
Porto Rico	3,228	14,006	35,202	18,733	21,216	92,385	18,477
Hawaii	1,039	1,538	2,289	1,656	17,090	23,612	4,722
San Francisco	2,305	1,461	17,229	852	111,503	133,350	26,670
Washington	1,959	1,442	6,895	2,534	11,653	24,483	4,897
Michigan	7,201	13,662	8,103	27,459	5,438	61,863	12,373
Other districts	1,249	13,418	9,070	30,989	31,715	86,441	17,288
Total	261,029	740,686	1,819,158	1,976,083	1,450,298	6,247,254	1,249,451

TABLE 19.—*Imports to the United States, by months, 1918 to 1922, inclusive*

Month	1918	1919	1920	1921	1922	Total	Average
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
January	69,660	1,308	335,569	20,733	38,978	466,248	93,250
February	73,229	9,930	244,153	63,732	20,307	411,351	82,270
March	6,822	26,006	369,262	41,405	181,520	625,015	125,003
April	54,167	7,043	143,371	7,243	241,505	453,329	90,666
May	32,434	44,439	88,452	13,016	155,497	333,838	66,768
June	14,727	53,607	104,942	9,036	28,840	211,152	42,230
July	2,011	16,790	95,009	32,181	213,254	359,245	71,849
August	1,307	85,968	35,224	125,029	58,147	305,675	61,135
September	3,612	199,609	59,743	261,965	56,171	581,100	116,220
October	152	94,490	177,742	306,447	237,484	816,315	163,263
November	99	60,414	119,396	652,883	79,373	912,165	182,433
December	2,809	141,082	46,295	442,413	139,222	771,821	154,364
Total	261,029	740,686	1,819,158	1,976,083	1,450,298	6,247,254	1,249,451
Equivalent in cars (500 bushels)	522	1,481	3,638	3,952	2,901	12,494	2,499

Fiscal year beginning July 1:	Bushels
1919	152,323
1920	1,884,102
1921	688,574
1922	2,487,565
1923	1,807,688
Total	7,020,252
Average	1,404,050

TABLE 20.—*Exports from the United States, by months, 1918 to 1922, inclusive*

Month	1918	1919	1920	1921	1922	Total	Average
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
January	19,282	66,286	27,701	93,389	45,151	251,809	50,362
February	25,256	60,237	72,481	117,032	32,064	307,070	61,414
March	26,677	31,235	98,753	56,416	28,193	241,274	48,255
April	19,627	48,443	46,410	72,352	100,649	287,481	57,496
May	62,562	110,656	148,715	99,585	84,158	505,676	101,135
June	94,592	80,509	84,295	107,593	46,315	413,304	82,661
July	83,988	66,158	54,892	71,868	55,857	332,763	66,553
August	84,563	117,969	61,787	57,520	124,052	445,891	89,178
September	81,795	63,143	120,085	57,214	104,090	426,327	85,265
October	77,497	57,532	91,418	50,379	72,825	349,651	69,930
November	66,729	62,311	84,440	48,283	71,043	332,806	66,561
December	50,287	52,480	54,801	35,711	48,481	241,760	48,352
Total	692,855	816,959	945,778	867,342	812,878	4,135,812	827,162
Year beginning May 1	808,214	856,103	1,039,622	734,210	760,527	4,198,676	839,735

TABLE 21.—*Exports from the United States, by countries, calendar years 1918 to 1922, inclusive*

Countries	1918	1919	1920	1921	1922	Total	Average
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Canada	190,216	218,129	264,262	171,273	204,952	1,048,832	209,766
Honduras and British Honduras	8,502	8,712	9,079	10,855	12,102	49,250	9,850
Panama	43,999	31,649	41,003	57,248	41,408	215,307	43,061
Mexico	54,206	46,207	52,133	59,599	36,913	249,058	49,812
Newfoundland and Labrador	15,537	10,268	2,924	7,593	4,594	40,916	8,183
Jamaica	3,528	3,349	4,095	7,378	7,162	25,512	5,102
Trinidad and Tobago	17,349	9,757	5,470	5,703	1,395	39,674	7,935
Cuba	299,800	400,560	485,266	473,203	402,879	2,061,708	412,342
Dominican Republic	11,171	12,056	20,601	21,286	16,716	81,830	16,366
Guiana (British, French, and Dutch)	18,695	17,479	8,940	4,163	2,477	51,754	10,351
Australia	632	6,242	10,589		16,963	34,426	6,885
New Zealand	6,628	10,919	17,841	5,270	41,828	82,486	16,497
Other countries	22,592	41,632	23,575	43,771	23,489	155,059	31,012
Total	692,855	816,959	945,778	867,342	812,878	4,135,812	827,162

ONION BULLETINS AND CIRCULARS

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AVAILABLE PUBLICATIONS

Beattie, William Renwick. The home production of onion seed and sets. U. S. Dept. of Agr. Farmers' Bul. 434. 1922.

————. Onion culture. U. S. Dept. of Agr. Farmers' Bul. 354. 1909.

Chittenden, Frank Hurlbut. Control of onion thrips (*Thrips tabaci* Lindeman). U. S. Dept. of Agr. Farmers Bul. 1007. Rev. Jan. 1920.

Truax, Hartley Eugene. United States grades for northern-grown onions, recommended by the U. S. Department of Agriculture. U. S. Dept. of Agr. Dept. Cir. 95. 1920.

————. United States grades for Bermuda onions, recommended by the U. S. Department of Agriculture. U. S. Dept. of Agr. Dept. Cir. 97. 1920.

Walker, John Charles. Onion diseases and their control. U. S. Dept. of Agr. Farmers' Bul. 1060. Rev. 1922.

Stevens, W Mackenzie. The Marketing and Distribution of American-Grown Bermuda Onions. U. S. Dept. of Agr. Bul. 1283.

STATE PUBLICATIONS (1916–23)[1]

California:

Rogers, S. S. Onion growing in California. Calif. Agr. Exp. Sta., Berkeley, Calif. Cir. 199. 1919

Warner, H. H. Growing harvesting, and marketing California Bermuda onions. Calif. Dept. of Agr. Sacramento, Calif. Special publication 31. 1923.

Idaho:

Vincent, C. C. Commercial onion culture in Idaho. Idaho Agr. Exp. Sta., Moscow, Idaho. Bul. 97. 1917.

Illinois:

Stevens, F. L., and True, E. Y. Black spot of onion sets. Ill. Agr. Exp. Sta., Urbana, Ill. Bul. 220. 1919.

Indiana:

Sayre, C. B. Commercial onion growing. Ind. Agr. Exp. Sta., La Fayette, Ind. Cir. 57, 1916.

Iowa:

Horsfall, J. L., and Fenton, F. A. Onion thrips in Iowa. Iowa Agr. Exp. Sta., Ames, Iowa. Bul. 205. 1922.

Louisiana:

Edgerton, C. W. Onion diseases and onion-seed production. Agr. Exp. Sta., Baton Rouge, La. Bul. 182. 1921.

Maine:

Partial directions for raising, harvesting, and storing of onions, squashes, cabbages. Maine Dept. of Agr., Augusta, Me. Bul. vol. 15, No. 2. 1916.

Maryland:

White, Thomas H. Onions; experiments and culture. Maryland Agr. Exp. Sta., College Park, Md. Bul. 195. 1916.

Massachusetts:

Anderson, P. J. Development and pathogenesis of the onion smut fungus. Mass. Agr. Exp. Sta., Amherst, Mass. Tech. Bul. 4. 1921.

Cance, A. E., and others. Connecticut Valley onion supply and distribution. Mass. Agr. Exp. Sta., Amherst, Mass. Bul. 169. 1916.

Smith, L. R. Onion growing in the Connecticut Valley. Mass. Bd. of Agr., Boston, Mass. Bul. 5, 1918. (3d ed., rev.)

———— Onion growing in the Connecticut River Valley. Mass. Dept. of Agr., Boston, Mass. Publication 102. 1922. (Rev.)

[1] Not necessarily available.

Michigan:

Pettit, R. H. Onion thrips (*Thrip tabaci*). Mich. Agr. Exp. Sta., East Lansing, Mich. Quar. Bul., v. 6, p. 107–109, Feb. 1924.
N. Y. Agr. Bull. 110, 1918.

New York:

Ellis, W. H. Onions. N. Y. (State) Dept. Farms and Markets, Albany.
Munn, M. T. Neck-rot disease of onions. N. Y. Agr. Exp. Sta., Geneva, N. Y. Bul. 437, 1917.

Ohio:

Humbert, J. G. Neck-rot of white onions. Ohio Agr. Exp. Sta., Wooster, Ohio. Monthly Bull., v. 1., p. 176–80. June, 1916.
Van Pelt, W. Black mold of onions. Ohio Agr. Exp. Sta., Wooster, Ohio. Monthly Bull., vol. 2, p. 70–6. March, 1919.

Oregon:

Lovett, A. L. Onion maggot. Oreg. Agr. Exp. Sta., Corvallis, Oreg. Cir. 37, 1923.

Pennsylvania:

Eyer, J. R. Bionomics and control of the onion maggot. Penn. Agr. Exp. Sta., State College, Pa. Bul. 171, 1922.

South Carolina:

Harkey, F. L. South Carolina grades for Bermuda onions. Clemson Agr. Coll., S. C., Ext. Div. Cir. 51, 1922.

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