PREPARATION OF STRAWBERRIES FOR MARKET

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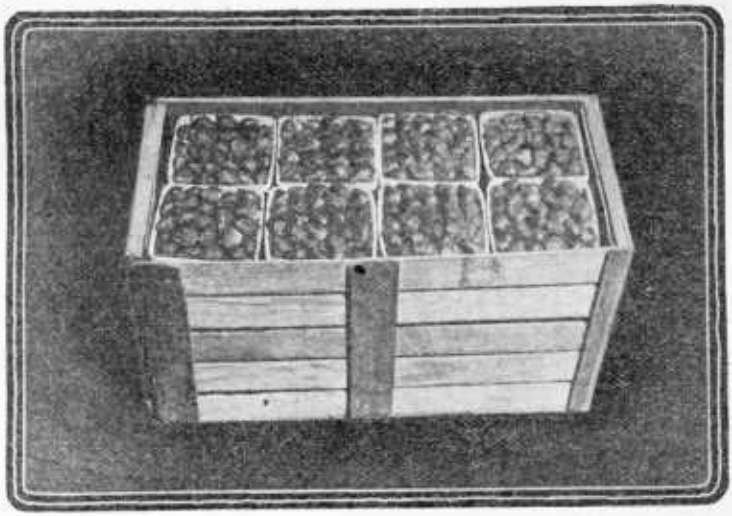

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UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Markets
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STANDARD STRAWBERRY GRADES are very desirable as a guide and basis for the use of growers in preparing their crop for the market, of buyers in the purchase of fruit, and of inspectors at the point of shipment or destination.

Growers should aim to produce berries of such uniformly high quality that no hand grading is necessary, as any extra handling adds to the liability to decay, yet in many instances hand grading is necessary and profitable. Whether or not the strawberries have been hand graded, the filled boxes should be classified as to grade before they are placed in crates for shipment.

This bulletin describes efficient methods of preparing strawberries for market. The unsatisfactory condition and grade of berries frequently found on the markets indicates a great need for standardization and better handling methods. The general use of a limited number of sizes and uniform standard packages will eliminate much confusion on the market.

PREPARATION OF STRAWBERRIES FOR MARKET.

CONTENTS.

IMPORTANCE OF GOOD HANDLING.

SUCCESS in marketing strawberries is dependent to a large extent upon the proper picking, grading, and packing of the fruit. Strawberries of a dependable grade and pack inspire in the trade a confidence which is reflected in a greater demand and higher

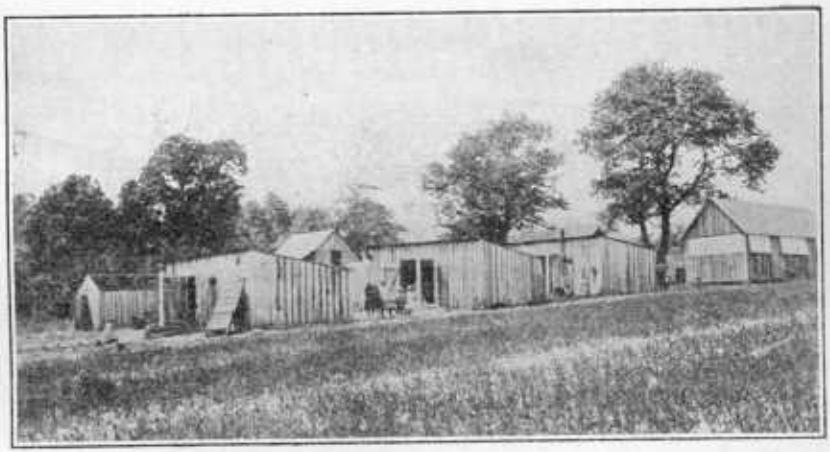

FIG. 1.—Camp for strawberry pickers, constructed by the grower.

prices for the product. The best of marketing facilities, however, can not overcome the handicap of indifferent handling methods, and good prices ordinarily are not obtained for an inferior product. Confusion, dissatisfaction, and lack of stability in the markets are caused, in a large degree, by carelessness in the preparing of fruit for the market.

Improvements in handling methods should come about through cooperative marketing organizations and by the efforts of growers,

together with the earnest cooperation of dealers. This bulletin, based upon the results of investigations in various strawberry-producing sections of the United States, suggests improvements in the methods now employed in the harvesting, grading, packing, inspecting, and shipping of strawberries.

THE LABOR PROBLEM.

Unless they are engaged well in advance of the harvest season, the grower often is unable to secure a sufficient number of pickers to harvest the berries as fast as they ripen. If graded out the overripe berries are a total loss, and if packed they reduce greatly the value of the firm berries with which they are marketed.

Local men, women, and children are preferable to transient labor. Usually they can be depended upon to remain through the harvest season. However, if there is a large acreage of berries in the neighborhood, outside help frequently must be secured. Some families who pick berries have camping outfits and travel from one strawberry district to another as the season advances. Many growers contract for labor from outside of the immediate neighborhood and furnish free camping facilities (see fig. 1). Many strawberries are picked by persons who begin work when the harvest begins in the Southern States and follow the berry season north. These laborers usually are efficient, but not always dependable. Many pickers stop work after the height of the season or as soon as the best of the picking is over. In some strawberry districts a premium of about a quarter of a cent per box is offered to the pickers who stay until the end of the harvesting season. This plan is illustrated on one of the tickets shown in figure 3.

PICKING.

Proper supervision of the picking force is especially important with the strawberry crop on account of the class of labor ordinarily used and the ease with which the berries are damaged. The quality of the berries delivered to the packing shed depends, to a large extent, upon the efficiency of the person in charge of the pickers. Usually a "row boss" or foreman is placed in charge of a group of pickers. He sees that rows are assigned to the pickers, that no ripe berries are left unpicked, that the number of green or otherwise defective berries placed in the boxes is held to the minimum, and that the pickers do not trample on the rows unnecessarily while picking or when walking to and from the packing shed. The number of pickers assigned to each foreman is best limited to 25 to 40. The grower can advantageously spend the most of his time in the general supervision of the picking, grading, and packing operations.

When berries are ripening rapidly the fields should be picked each day, and, if possible, the picking and packing should be done during

the cooler parts of the day. The proper stage of ripeness for picking strawberries depends upon the variety and the distance to be shipped. Some varieties naturally are firm and can safely be allowed to attain a full red color, while others soften quickly upon ripening and therefore must be picked before they are of full red color. Varieties which soften quickly are not suitable for long-distance shipment. Obviously, berries for local markets may and should be allowed to ripen more fully than those intended for distant markets. Most of the shipping associations in southern States from which berries must be transported long distances have picking instructions that call for berries from about three-fourths colored to a full red color. It is not possible to have all berries picked at exactly one stage of ripeness. When the pickers are instructed to pick with three-fourths full red color, berries may be found in their trays which vary from one-half colored to full red color, depending largely upon the experience and efficiency of the pickers and the closeness of the field supervision. Proper supervision of the pickers reduces this variation to a minimum. Strawberries must be picked when firm enough to be transported to

FIG. 2.—Proper method (left) and two improper methods (right) of picking the strawberries.

market and distributed to consumers successfully, but all fruits sell, to a large extent, on their appearance, and, other conditions being equal, well colored berries will sell faster and return larger profits than poorly colored fruit. Growers and shippers will find it profitable to trace enough of their shipments to market to determine whether they are delivering them to dealers in the best possible condition. In this way they often avoid losses which otherwise might be incurred, and are able to appeal to the consumer's appetite, with a resulting increase in the consumption of strawberries.

Pickers should be taught the proper method of picking. Large quantities of desirable berries may be ruined by carelessness, indifference, or inexperience in picking. Picking is done best by the use of the thumb and forefinger (fig. 2), each berry being pinched off, with a stem about three-eighths to one-half inch long, and placed in the box carefully, not thrown, tossed, or dropped into the box. To gain speed, there always is a tendency for the picker to pull or snatch off the berries and toss them into the boxes. Some pickers crush, bruise, or squeeze much fruit while picking, by holding too many berries in

the hand at one time; others pile up berries on full trays which must later be taken off and placed in other boxes. Such practices result in bruised berries as well as many without the hull or cap. Damaged berries and berries without hulls do not carry well to the market, and

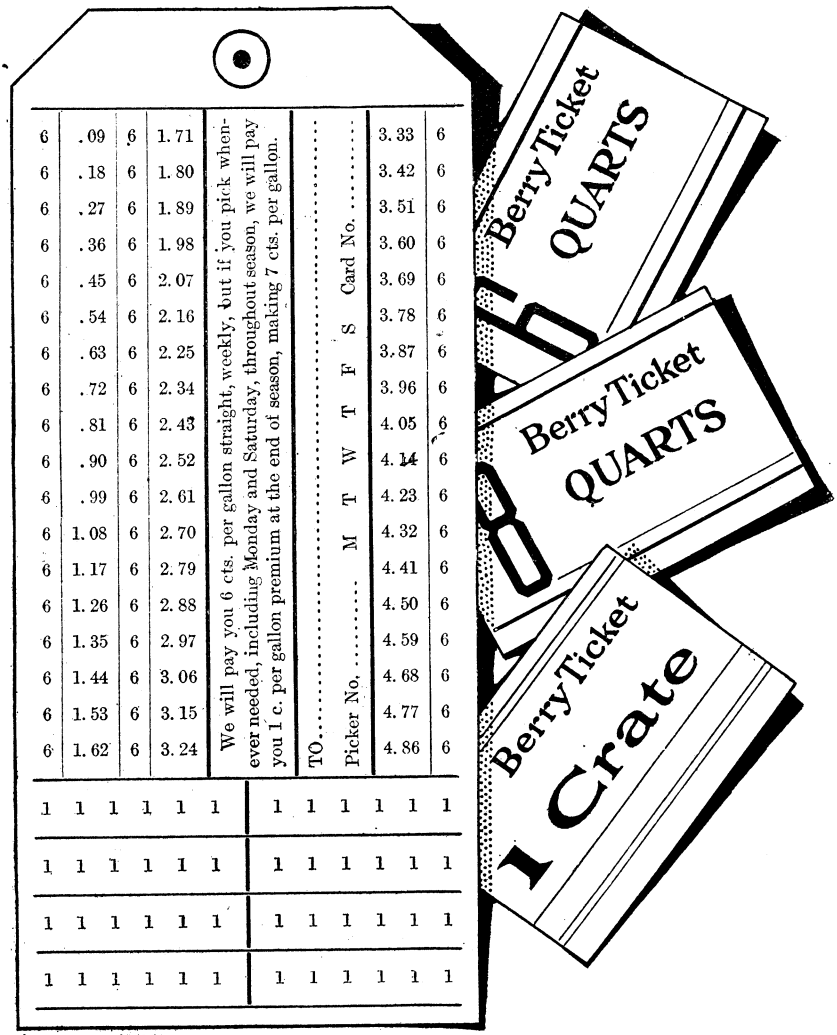

FIG. 3.—Two common forms used as pickers' tickets.

in proper picking are not allowed in the boxes. Unless each row is picked clean of all berries that are ready at each picking, the next picking will contain overripe fruit.

Two methods of giving pickers credit for their work are in common use, either of which seems satisfactory. (See fig. 3.) Under one method small tickets are issued, bearing numbers conforming to the number of filled boxes delivered to the packing shed. The "meal

ticket'' method also is common. Tickets or tags are issued, bearing printed figures either in terms of money or numbers of boxes, or both. These tickets are punched as the berries are delivered. Some growers who employ this method find it necessary to use an adjustable punch which can be changed from day to day to prevent dishonesty. With either method the picker may cash his tickets at stated periods, and in many sections they are accepted by local storekeepers as cash in payment for purchases. By a third method, which seems practicable where many pickers are employed, a bookkeeper is stationed at the entrance of the packing shed, and records in plain view of the picker the number of filled boxes which each picker delivers.

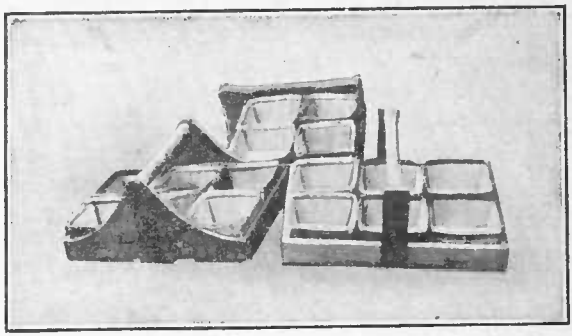

FIG. 4.—A convenient and popular-sized picking tray.

The tray used for carrying the berry boxes into the field, whether made at home or in a factory, needs to be light in weight, substantial, and built so that the boxes fit in it snugly. The size varies from those which hold 4 boxes, up to 12 boxes. The most popular sizes are those which hold 4 or 6 boxes. (See fig. 4.) The large trays are unwieldy in the hands of the picker, and unless provided with legs they can not be placed on the ground in the field without danger of crushing unpicked berries. (See fig. 5.) So much time is used in filling the large trays that there is danger of the fruit becoming overheated by exposure to the sun before it is delivered to the packing shed. One tray at a time is enough for each picker to carry to the field, to be delivered to the packing shed as soon as it is filled. In some sections the growers allow the pickers to set each box on the ground as filled. This is a bad practice if too many boxes are filled and exposed to the sun before they are delivered to the packing shed. Some growers furnish laborers for collecting the boxes from the

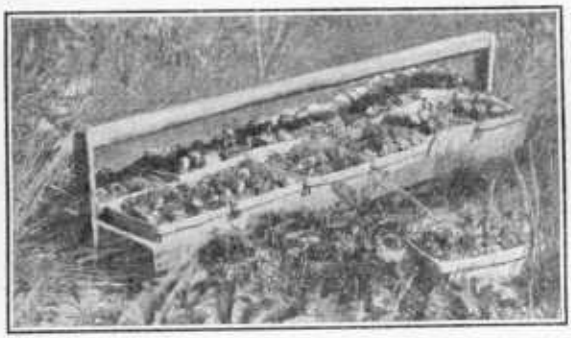

FIG. 5.—A 12-quart tray, which is too large for convenience and allows berries to stand in the sun too long.

pickers in the field as fast as they are filled, in order to avoid the necessity of so much walking back and forth by the pickers. The larger trays are used to good advantage under this method.

Picked berries are injured by exposure to the sun, rain, or dust, either in the field, at the packing shed, or while being hauled to the railroad.

GRADING.

Strawberries should be graded, either by hand-sorting the individual berries or by classifying the filled boxes. Which of these two methods will prove most satisfactory will depend upon local conditions. Growers are found, in every shipping section, who, by exercising care, grow berries of such uniformly high quality that no hand grading is necessary. This should be the ideal of all growers, as any extra handling adds to the liability to decay.[1] In many instances, however, hand grading is necessary and profitable.

HAND GRADING.

Hand sorting or grading consists of separating the undesirable or cull berries from the merchantable fruit. It must be done in the field or at the packing shed. The amount and the method of hand grading which will secure maximum results will not be the same for all conditions and in all shipping sections, but in most instances it will be found profitable to eliminate the overripe, green, deformed, very small, or otherwise undesirable berries from field-run stock. All leaves, sticks, and other trash are removed at the same time.

Field grading by the pickers causes the least amount of handling, but it is successful only when it is strictly supervised. Pickers, as a rule, do not like to grade or sort the berries while picking. Yet many strawberry growers are successful in having the grading done in the field as the berries are picked. They encourage the pickers to grade out the cull berries by paying them for all that are picked, but require that the cull stock and the merchantable fruit shall be placed in separate boxes. These growers know that when the laborers have picked cull berries they are very likely to put them into boxes with the sound stock, and in order to avoid this the pickers are paid the same price for picking the cull berries as for the good ones. The separation of the large and small stock might be encouraged by paying more per box for picking the small berries than for the large ones. This practice could be abused by the pickers but proper supervision should regulate it.

In most of the strawberry sections no grading is attempted except at the packing shed. The method and care with which strawberries are graded at packing sheds vary. A large percentage of the growers do nothing further, even at the packing shed, than to place in crates

[1] Stevens, Neil E., and Wilcox, R. B. Rhizopus rot of strawberries in transit. United States Department of Agriculture, Bul. 531. 1917.

the boxes of berries as delivered by the picker. A few growers cull out only the green, overripe, decayed, or otherwise undesirable berries found on the tops of the boxes. Others empty the berries from the box in which they are picked into another box and during the process sort out all of the cull berries which are noticed.

A very thorough method of grading or sorting is practiced to some extent in the Ozark berry section, where the principal variety grown is the Aroma. Each box of field-run berries is emptied into a specially constructed tin grading pan (see fig. 6), where the undesirable berries are sorted out as the fruit is poured from the pan back into a box. This "pan grading," when done carefully, eliminates all berries considered undesirable, and where the fruit should be rehandled the grading pan is a very desirable and effective aid.

FIG. 6.—"Pan grading" as practiced to some extent in southwest Missouri.

The success and feasibility of pan grading depends upon the following factors: (1) the variety of the berries; (2) the amount and quality of labor available to the grower; and (3) securing an adequate price for the graded fruit. Strawberries of the Aroma variety will withstand considerable rehandling and have been pan-graded through several seasons in southwest Missouri with excellent results. Fruit of tender varieties, or lots of fruit which as a whole are slightly overripe, are damaged materially by rehandling, and the poor condition of the graded berries when they reach the market, caused by soft stock, more than offsets any extra market value added by grading out the culls at the packing shed.

Successful pan grading depends also upon a sufficient force of intelligent laborers who work with care and speed. The total expense of this grading includes the cost of picking the culls, the labor cost of grading them out at the packing shed, and the loss in total bulk which results from discarding the culls. The pan-graded product must be

sold for a proportionately higher price than the ungraded product, and the grower must receive this adequate increase in price before he will be repaid for his efforts.

CLASSIFYING THE FILLED BOXES.

Whether or not the berries are hand-graded, they should be classified at the packing shed. This classification should consist of separating the filled boxes according to quality, grade, and size, and placing those of similar value into crates by themselves. Often the boxes of berries from certain parts of the field, or those picked by careless laborers, are of such low quality that when mixed with boxes containing berries of high quality they injure materially the value of the entire package of fruit. Some boxes may contain berries of such low quality that they will have to be discarded as culls. Such classification should be based on well-defined standards, and the crates marked accordingly, for the benefit of the inspector at the loading shed, the dealers, and the consumers.

COMMERCIAL STRAWBERRY GRADES RECOMMENDED.

The following grades are recommended as a guide for the grower in preparing his crop for the market, for the inspector at the shipping point, and as a basis for sales made at the shipping point or in the market. These recommendations are made after a considerable study of the harvesting and shipping methods in the principal commercial strawberry-growing districts, and also of market needs and demands. They include what seem to be the best features of the grading rules now used in the different shipping sections throughout the United States, as well as other features which were found necessary.

U. S. GRADE No. 1.

This grade shall consist of firm strawberries of one variety, with the cap (calyx) and a short stem attached, which are not overripe, underripe, undeveloped, decayed, or moldy, and which are practically free from foreign matter and from damage caused by sand, moisture, disease, insects, or mechanical means. The minimum diameter shall be three-fourths ($\frac{3}{4}$) of an inch.

In order to allow for variations incident to careful commercial grading and handling, ten (10) per centum, by volume, of the berries in any lot may be under the prescribed size, and, in addition, five (5) per centum, by volume, of the berries in such lot may be below the remaining requirements of this grade.

U. S. GRADE No. 2.

This grade shall consist of strawberries which do not meet the requirements of U. S. Grade No. 1 and which do not contain more than eight (8) per centum, by volume, of berries that have been seriously damaged from any cause.

MARKING CONTAINERS.

When packed and shipped in crates, the boxes should be well filled and the following information plainly and neatly marked on one end of each crate: The grade name ("U. S. Grade No. 1" or "U. S. Grade No. 2"), the name of the variety, and the grower's name and address.

DEFINITION OF GRADE TERMS.

"Diameter" means the greatest dimension at right angles to a straight line running from the stem to the apex.

"Practically free from foreign matter and from damage" means that the appearance of the lot shall not be injured by the causes mentioned to an extent readily apparent upon casual examination.

"Seriously damaged" means injured to such an extent as to render the berry unfit for human consumption.

"Overripe" means dead ripe, becoming soft, a condition necessitating immediate consumption.

"Underripe" means so immature that less than two-thirds of the surface of the berry is of a pink or red color.

"Undeveloped" means not having attained a normal shape and development, owing to frost injury, lack of pollination, insect injury, or other causes. "Button" berries are the most common type of this condition.

Strawberries which do not conform to the specifications of one of these two grades ordinarily are not high enough in quality to be shipped. When stock which does not meet the requirements of the U. S. Grade No. 2 is shipped, it can be sold only upon the basis of the general quality of each individual shipment. The wide variation in value of the different lots of such undergrade stock would preclude the possibility of placing them in definite grades.

In the determination of grades for strawberries the factors to be considered are size and quality.

SIZE.

The size of strawberries varies widely with the section and with the variety. However, as size normally would be considered as much as, or more than, any other factor in connection with grades, the minimum size for the No. 1 grade must be definitely stated. In districts where two grades are recognized, size is usually the main difference between them. While it is not practicable to separate all of the different sizes in the same manner in which boxed apples or oranges are sized, yet more careful attention is needed in order to prevent boxes filled with small berries from being mixed with those of desirable size in the shipping crates.

QUALITY.

Berries which are watersoaked or have the least indication of decay should not be shipped, and those which in any way have

become bruised, crushed, cut, or otherwise damaged for shipping should be kept out of the boxes. Those which are covered with sand or dirt are very difficult to sell, and should be classed in the No. 2 grade.

The carrying quality, which affects the market value directly is dependent upon the firmness or degree of maturity of the berries. Overripe berries placed in the box by a picker or overlooked by a packer usually become soft, or perhaps decayed, moldy, or "leaking," by the time a market is reached, and they mar the appearance and value of the good berries with which they are packed. Therefore, one of the first requisites of a good grade of strawberries is that they shall be firm enough to carry to the market. Green berries also must be kept out of the crates. If the fields are picked carefully every day or every other day, depending upon the rapidity with which the berries ripen, no difficulty should be experienced in obtaining berries of a reasonably uniform and proper degree of maturity so that the shipper may approximate the distance which they can be sent safely.

Varieties have characteristic appearances, sizes, and carrying qualities, and only berries of one variety can properly be placed in a box or crate, unless the package is marked plainly "mixed varieties," or marked with a statement as to the number of boxes it contains of each variety. There is very little occasion for a mixture of varieties, as they usually are grown in separate rows.

The multiplicity of grade names used in different shipping sections causes much confusion. Not more than two grades are ever used, but they are designated by such names as "Fancy" and "Choice," or "Fancy" and "Number One," or "A" and "B," or "Firsts" and "Seconds," and many others. It has been the aim of the Bureau of Markets to standardize names for grades as well as the grades themselves, and it is recommended that the first and second grades shall be called No. 1 and No. 2, respectively. Objection often is raised to designating stock of second quality as No. 2 grade, yet if these terms were generally used and understood there would be no difficulty in disposing of a No. 2 grade at prices commensurate with its value.

Every shipping section needs fixed standard grades, and it is believed that the grades here outlined can be generally adopted. Strawberry shipping associations need such standards as a guide and basis for their growers in preparing the crop for market, and as a basis for inspection at the loading station. The need is even greater where the growers are unorganized. Buyers, both at the point of shipment and in the market, should have a definite basis upon which to purchase the fruit. The value of standard grades will depend upon their specifications and the extent to which the growers and shippers adhere to them.

PACKING.

Strawberry boxes properly filled are neither slack nor so full that the berries are likely to be crushed; they are full enough to look attractive and they are still well filled after being transported to the market and sold and delivered to the consumer. At the same time there is danger of filling the boxes so full that the cover will crush many berries. Usually growers fill their boxes well, but there are still a few who appear to think they can save berries or cheat the buyer and consumer by slack packing, and thus increase their own profits. The grower loses eventually, however. Slack-packed berries are quite as difficult to sell as those which are beginning to decay, if not more so. The box must contain no leaves,

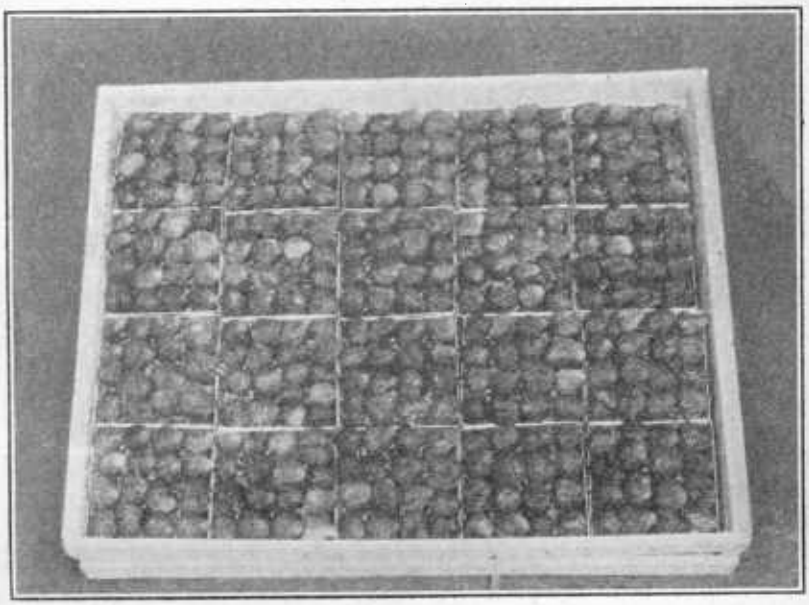

FIG. 7.—A 20-pint crate of California strawberries. Note the method of packing.

sticks, or other trash. Boxes in the second, third, or fourth layer of the crate must be as well filled as those in the top layer. Some sections cling to the practice of "facing" or placing the berries in the top layer on their sides, all pointed one way (see fig. 7), or placed with the stem of the berry down, in order to add to the attractiveness of the package. This makes a very attractive package of fruit, and there seems to be no harm in the practice until the tendency creeps in of "topping" or putting the best berries on the face of the box. Many shipping associations claim that unless strawberries are very high in price, the extra labor cost of "facing" the boxes of berries is not warranted. "Topping," or placing the best berries in the top layer of the box and the poorer or smaller berries in the bottom of the box, is not allowed by the best shipping associations, and the

practice should be abolished entirely. The face of a box of berries should be a fair sample of the entire contents of the box, and the contents of the top boxes in a crate should represent fairly the entire contents of the crate.

The Canadian law concerning the face of packages of fruit states that "no person shall sell, or offer, expose, or have in his possession for sale, any fruit packed in any package in which the face or shown surface gives a false representation of the contents of such package, and it shall be considered a false representation when more than 15 per cent of such fruit is substantially smaller in size than or inferior in grade to, or different in variety from, the face or shown surface of such packing." When the fruit is so faced that it is not in compliance with the law, it is subject to confiscation.

FIG. 8.—Type of vehicle and equipment used by growers at Bowling Green, Ky. Note the wagon cover and the springs; also the association rules at the right.

Strawberries should be graded, packed, hauled to the station, and placed under refrigeration as soon as possible after picking. Vehicles for hauling the berries to the railroad station require good springs, and a canvas, tarpaulin, or some other wagon cover is needed to protect the berries from the rain, sun, and dust. (See fig. 8.)

PACKING SHEDS.

MANAGEMENT.

Careful supervision at the packing shed by the grower, a member of his family, or a reliable employee is of vital importance if a satisfactory grade and pack is to be secured. It is especially necessary if the field supervision is incompetent or if the berries are to be graded or classed at the packing shed.

Work at the packing shed includes receipting for the berries delivered by the pickers, grading or classifying, packing, placing boxes in the crate, marking, and nailing on the covers. When the acreage is small, all of this work may be performed by the grower or some member of his family, but when the acreage is large, frequently one person's time is occupied in receipting for fruit delivered by the pickers. Some growers have this person act in the capacity of inspector to note the quality of the berries delivered by each picker, and to note whether the boxes are properly filled. The number of laborers required at the packing shed will depend upon the quality of the berries, the thoroughness of the grading, and the number of pickers in the field.

LOCATION AND PLAN.

The location of the packing shed with reference to the berry field is important. If it is properly placed only a minimum amount of walking is necessary for the pickers to deliver their berries, and the temptation to walk across the rows to reach the shed is removed. A location at the ends of the rows near the center of the field will be satisfactory for a small field. For larger fields, a path may be laid off at right angles to the rows near the middle of the field, and the packing shed located at one end of or along this path. With this arrangement the pickers can be required to walk between the rows to the central path to reach the shed. A location convenient to the farm road is desirable.

Packing shed facilities vary from the shade of a near-by tree to a tent, a temporary shed, or a well-built permanent shed. Expensive, permanent sheds are exceptional. The most common type is a cheaply constructed, board-roofed shed with or without boarded sides. There are many reasons for the predominance of the cheap shed. Strawberry fields normally are not profitable for many years in succession, and the largest number not after the second or third year. It has been a common practice in some berry sections to use only newly cleared land each time a new plantation is set. For these reasons it is necessary to change the location of the sheds frequently. Often growers prefer to have two or three conveniently located temporary packing sheds rather than one permanent shed, which can not always be located so conveniently. Sheds are used but a short period, and some growers prefer to erect a temporary structure just before the harvest begins and take it down at the end of the strawberry-picking season. A temporary shed is best adapted to the conditions mentioned. Where the soils are more fertile, however, and the fields in which the strawberry crop is used as a part of the rotation are closely grouped, a permanent packing shed is advisable.

The convenience of the packing shed is dependent largely on the plan upon which it is built. The plan shown in figure 9 is good.

The cheaply constructed shed shown in figure 10 approximates this plan. Pickers are all required to enter one end of the passageway shown at the front of the shed. An inspector who receipts for the boxes of berries delivered by the pickers stands at the entrance of this passageway. The pickers place the filled boxes on the receiving table and walk on through to the other end of the passageway, where they may secure a supply of empty boxes. The back portion of the receiving table is used as the grading and packing table.

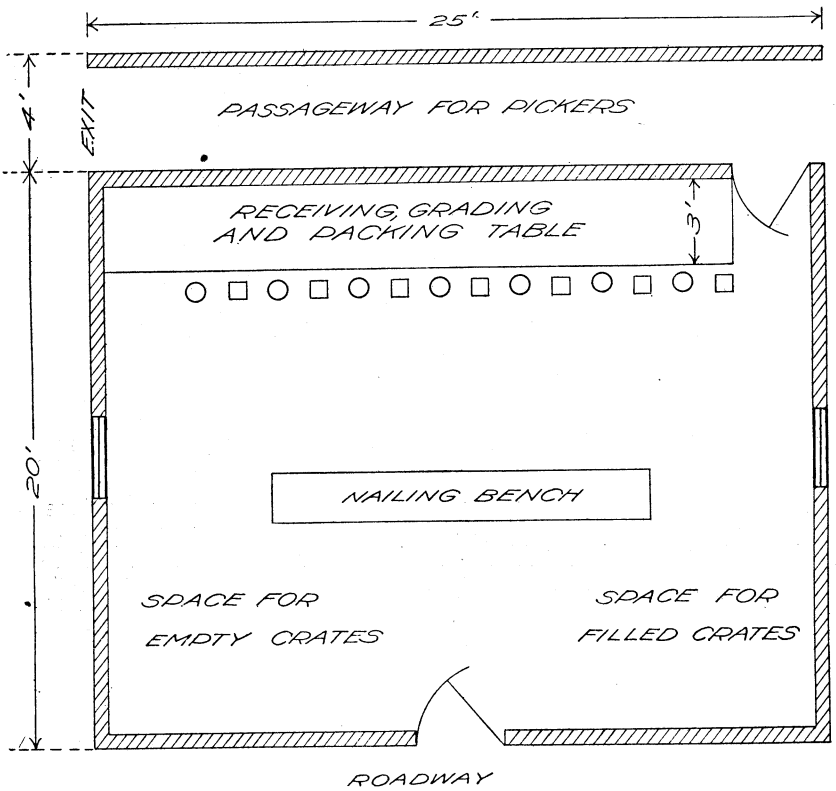

FIG. 9.—A simple yet satisfactory plan for a strawberry packing shed.

Benches, upon which empty crates are placed for filling, are at a convenient distance from the packing table. Back of the packing table, a solidly built bench is provided upon which the filled crates are placed for nailing. Plenty of space is needed for stacking the filled crates, without exposure to the sun, and also for keeping a supply of empty crates. In the more expensive sheds storage space for empty crates is provided in the second story. It is very desirable to have a free circulation of air in the packing shed for the comfort of the packers and for the ventilation of filled crates.

SHIPPING PACKAGES.

The crates in most general use for strawberries contain 24 or 32 quart boxes. The former size is used in Tennessee, Missouri, Kentucky, Arkansas, Texas, Louisiana, and some other sections, and the latter in Florida, the Carolinas, Virginia, New York, Maryland, and Delaware. Possibly the last two States use as many or more of the 48-quart crates, and in the section about Norfolk, Va., a 60-quart crate is used extensively. The Louisiana section uses the 24-pint crate for early berries. The 24 deep pint size (Hallock) is used extensively also in the Northwestern States (see fig. 13), and in California 20-pint crates (see fig. 7) are used, as well as shipping trays containing fifteen 12-ounce boxes, and chests containing 10 and 20

FIG. 10.—A strawberry packing shed with a plan similar to that shown in figure 9.

trays, each tray holding two 2-pound or six 8-ounce shallow boxes (splint baskets). (See fig. 11.) Michigan and Illinois use the 16-quart Hallock crate. (See fig. 13.)

Three types of crates, each constructed to accommodate boxes of different shapes, are most commonly used, viz, the ventilated crate (fig. 12) containing 24 pints, or 24, 32, 48, or 60 quart boxes of the type shown in figure 6; the Hallock crate containing 16 and 24 quarts or 16 and 24 pints, and the Leslie crate containing 24 pint or 24 quart boxes of either liquid (in past years) or dry measure. (See fig. 13.) By far the largest part of the berries marketed in the United States are shipped in crates and quart boxes of the first type, and they are becoming more popular each year. In the Atlantic Coast States the covers are fastened on by means of hinges and a "catch," making inspection less difficult. At least two types of folding ventilated crates are now in use.

Pony refrigerators (see fig. 14) are used extensively in Florida for early express shipments to northern markets. Similar refrigerator boxes are being used to some extent around Los Angeles, Cal., and in a few sections where the everbearing strawberry is grown on a commercial scale. There seems to be no uniform method of manufacture, although those used in Florida usually hold 64 or 80 quart boxes of berries. Metal trays are built through the center or in the top of the box, or both, to hold the ice supply. Air-tight covers are clamped on after the berries and ice are in place. These pony refrigerator boxes seem to be well adapted to long distance express

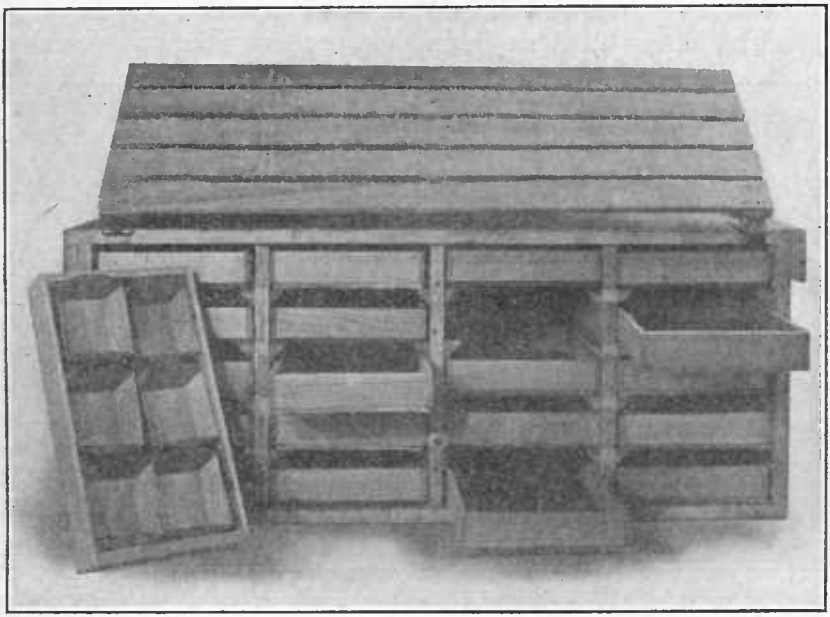

FIG. 11.—The California chest, used for shipping berries a short distance into San Francisco and returned to the shipper. Notice the splint baskets in which the berries are placed.

shipments when it is not possible to load carlots and when prices are high. They are not gift packages, and must be returned to the owner after being emptied.

Clean, neat crates constructed of material strong enough to insure the safe delivery of the fruit to the market are best. Soiled or secondhand crates injure the sale of the berries, as the difference in appearance on the market between a new, clean package and a soiled or secondhand package ordinarily will make a sufficient difference in price to more than compensate for any saving in cost from using the soiled package.

The small containers in which strawberries are marketed are known as boxes, baskets, cups, or tills. In this bulletin they are termed boxes. Strawberries are marketed chiefly in quart and pint

boxes. Figure 15 illustrates the diversity of types and capacities of berry boxes used in this country in the past. This lack of standard capacities has resulted in much confusion and deception. A few years ago the wine quart, containing 57¾ cubic inches, was used almost entirely in many sections. So-called 1-pound boxes and other short boxes also were in common use. At present nearly all of the principal producing areas east of the Rocky Mountains use boxes of a dry pint (33.6 cubic inches) or dry quart (67.2 cubic inches) capacity. One section uses liquid measure packages, and in another a short package containing two-thirds of a quart has been used. Different

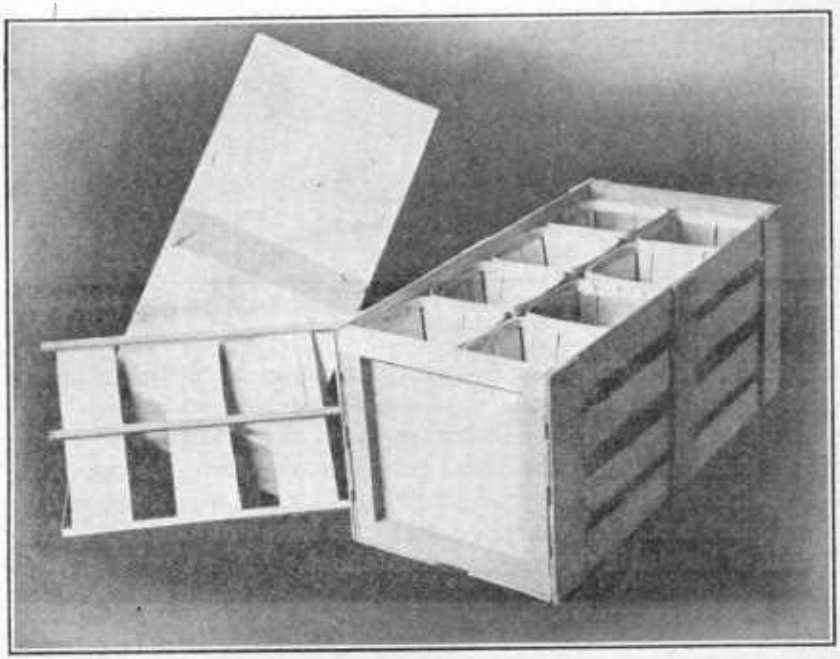

FIG. 12.—The American ventilated crate—a popular and satisfactory type of package for strawberries.

producing areas on the Pacific coast use boxes (or trays) containing approximately a half pound, three-fourths pound, 1 pound, and 2 pounds.

The recent standardization, by act of Congress, of these boxes when used in interstate traffic will correct this evil to a large extent. However, in local or intrastate shipping also it is very important that only standard packages be used. Manufacturers can not know when they or their customers may wish to use packages for interstate shipping. Shippers or receivers are likely at any time to find it necessary to relieve an overloaded local or State market by shipping berries to another State. Since November 1, 1917, they can not do this lawfully if other than standard containers are used, and for this reason they might be greatly hampered in their marketing.

STANDARDIZATION OF PACKAGES.

An insistent demand for the standardization of capacities of containers for strawberries and other small fruits has come from consumers, officials concerned with weights and measures, wholesalers, shippers, and growers. It is not necessary to explain the need of

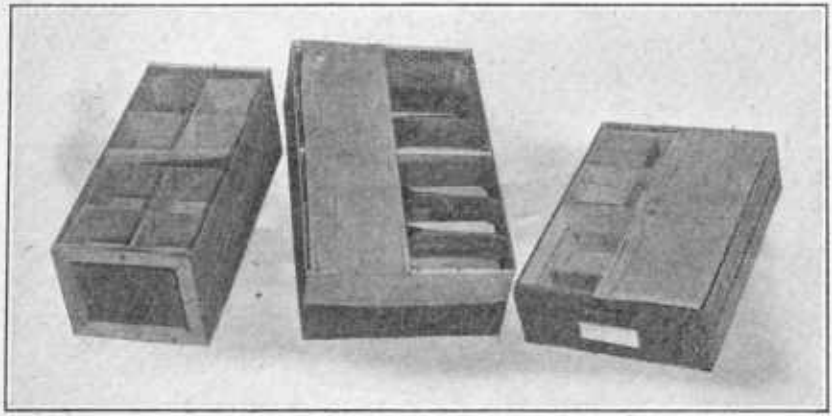

FIG. 13.—Strawberry crates: 16-quart Hallock (left); 24-quart Leslie (middle); 24-deep-pint Hallock (right).

standard sized packages or to point out the evils of using "short" packages, but it is believed that they have hindered the development of the strawberry industry and cost those interested a large sum of money. About 20 States have laws requiring the use of dry measure boxes for strawberries, and one State has standardized the liquid quart box. A number of cities also have ordinances requiring the sale of berries in dry measure containers.

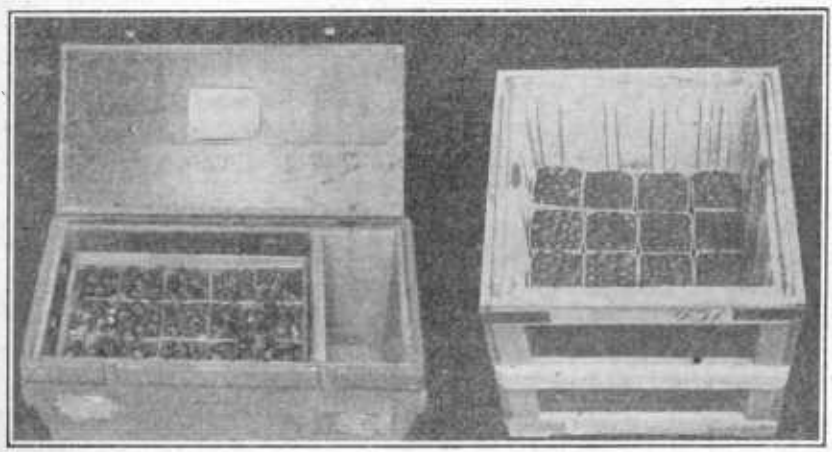

FIG. 14.—Pony refrigerators used for express shipments from California (left) and Florida (right). The ice pan is placed at the side in the California package and at the top in the Florida package.

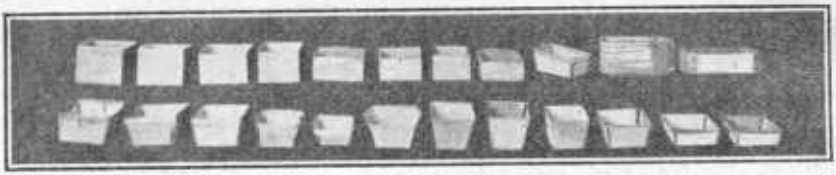

FIG. 15.—Diversity of types and sizes of berry boxes before the standard container act went into effect.

The United States standard container act, which became effective November 1, 1917, establishes three standard sizes for Climax baskets, namely, 2-quart, 4-quart, and 12-quart, fixing their dimensions, and also establishes the dry half pint, dry pint, dry quart, or multiples of the dry quart as standards of capacity for baskets and other containers for small fruits, berries, and vegetables. This act makes it illegal to manufacture for shipment or to sell for shipment or to ship in interstate commerce containers for strawberries, whether filled or unfilled, of any capacity other than a dry half pint, dry pint, dry quart, or multiple of a dry quart.[1] The exact dimensions for the berry boxes are not specified in the law; therefore boxes of the Leslie, Hallock, American ventilated, or any other type may be used so long as their capacities are legal. This act is administered by the Department of Agriculture through the Chief of the Bureau of Markets. Requests for information with regard to its interpretation and enforcement may be addressed to this department.

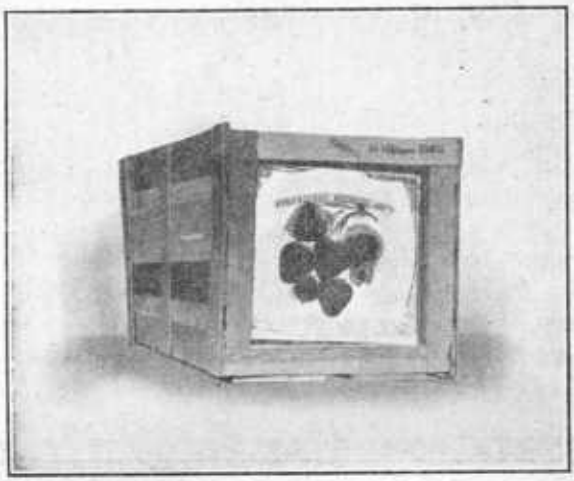

FIG. 16.—A brand label. The illustration shows also the ordinary method of marking the crate with variety, net contents, and grower's name and address.

BRANDING AND MARKING.

Many strawberry shipping associations use brand labels which are pasted on the ends of the crates. (See fig. 16.) This practice is very advisable for an association which wishes to build a reputation for its berries. The labels need not be expensive.

[1] Circular 76 of the Office of the Secretary, United States Department of Agriculture, containing the law and the regulations for its enforcement, may be obtained upon request from the Division of Publications, United States Department of Agriculture.

To comply with the net weight amendment of the Federal food and drugs act, a statement of the quantity of its contents must be marked plainly on the outside of each crate. This statement of contents must be in terms of the largest unit contained in the package; for example, half pints, pints, or quarts. The usual statement is similar to the following: "This crate contains 24 dry quarts," or "Contents 24 dry pints." In addition to this mark, the associations generally require that the crate be stamped with the name of the variety of the berries, the grade, and the grower's name and address. When berries are marked in this manner, it is easy to trace complaints of carelessness, or fraudulent packing, back to the grower who is responsible.

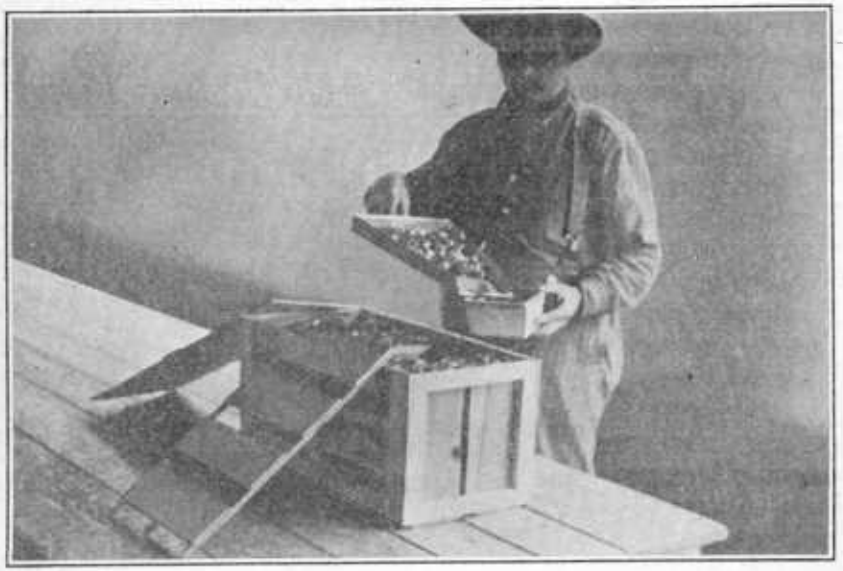

FIG. 17.—Inspecting the strawberries as delivered to the loading shed or platform.

It adds to the appearance of the package if the markings are arranged neatly in the upper left-hand corner of one end of the crate. Marks made with rubber stamps or stencils are more attractive than pencil, crayon, or similar markings.

INSPECTION AND LOADING SHEDS.

Every shipping association needs a rigid system of inspection at the loading shed. (See fig. 17.) This is a prerequisite to the success of such an organization, because a strong, permanent marketing association can be built up only by shipping a dependable, standardized product. Many details present themselves during the season which call for patience on the part of the growers, inspectors, and manager. Raising the standard of strawberry grading and pack-

ing methods used in a given community must be regarded as an educational process, and perfection should not be expected at once. However, if the work of grading and inspecting strawberries is to bring financial returns, growers must cooperate in packing grades of strawberries which the trade will recognize as always uniform and dependable. Any inspection system is fundamentally wrong which does not make it possible for the grower with well-packed, high-grade berries to secure more for his stock than another who delivers inferior, poorly graded stock. Proper discrimination by shipping associations encourages better grading and packing.

A systematic inspection of strawberries in producing sections where there are no cooperative organizations is even more greatly needed, and it is no more difficult to maintain if the demand for it is sufficiently strong. Such inspection may be established and maintained under State or county horticultural or standardization laws, or under a board of trade, chamber of commerce, or other local agency with which the majority of the growers, buyers, and shippers will agree to cooperate. Such inspection has been established in various localities for apples, cantaloupes, pears, and tomatoes, and Washington and California have State laws under which nearly all their fruits are inspected. The best results are secured when the inspectors can spend part of their time, or may take turns, in visiting all of the growers' fields in order that pickers, graders, and packers, as well as growers, may be shown just what the inspectors require and where the grade and pack may be improved. The inspector, when he finds a crate containing boxes which are not full, or boxes containing many bruised, mashed, or other cull berries, if so authorized, sees that such a package is barred or shipped by itself to neighboring points and sold on its merits.

The troubles which always are attendant upon any attempt of farmers to cooperate are generally apparent in strawberry shipping associations. Ineffective efforts at cooperation are frequently evidenced by the presence of two or more associations at each shipping station. Frequently in such places, when the inspection begins to be really effective at one association, some growers are not willing to pack their fruit according to the established grades, and so deliver their berries to another association which has a less effective inspection service. These growers fail to realize that they are members of an association formed for their mutual benefit and that the management should have their constant support. Where two or more competing associations are formed, none is able to maintain as high standards of quality or to market as effectively as if the growers were united in their efforts.

In an efficient organization, inspectors are responsible only to the board of directors. Growers are not allowed to interfere with or

attempt to influence them, but should refer their grievances for adjustment to the board of directors, the manager of the association, or other authorized person. The main factors considered by inspectors are size, degree of ripeness, cleanliness, and whether or not the crates are properly filled. The degree of ripeness at which strawberries are accepted for shipment in carload lots depends upon the period of the shipping season and the weather which prevails at picking time. During cool, dry weather, berries may be accepted in a riper condition than during hot, damp weather.

Adequate loading sheds would be of much benefit in almost any shipping section, both to growers and to shippers, besides providing a place for an effective inspection. Usually berries could be marketed

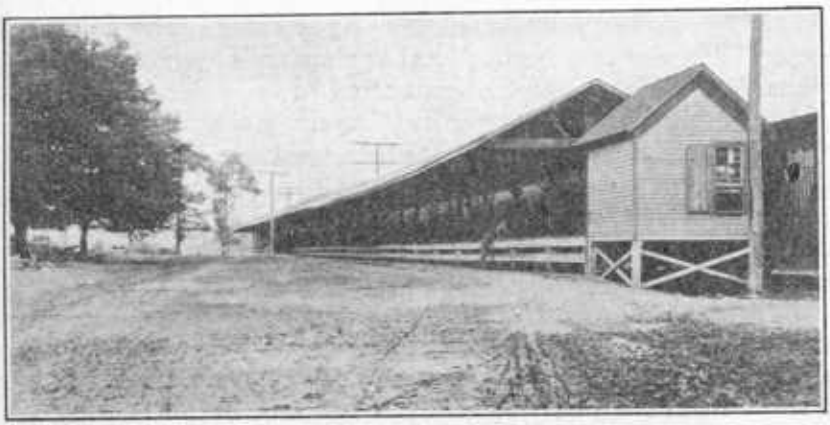

FIG. 18.—A strawberry loading and inspection shed.

to better advantage and buyers' needs would be served better if crates of berries could be separated with greater care into classes suitable for long and short hauls.

In some of the strawberry shipping sections of Arkansas, Missouri, and Tennessee, specially built loading sheds may be found at the shipping stations. (See fig. 18.) These sheds usually are built by the railroads for the convenience of the growers. In a few instances the shipping associations own their loading sheds. They are built so that it is possible to load one or more cars at a time, according to the importance of the shipping point. Some sheds are used only as a place for the grower to unload his fruit before it is placed in the cars. In parts of the Ozark section each grower's strawberries are inspected at the shed before they are loaded into the car. These sheds are equipped with benches or tables upon which the filled berry crates are unloaded for the convenience of the inspector. At one point a double row of tables is provided, and after the crates are inspected and marked they are shifted to the second or back table, the covers

are renailed, and they are placed in the cars. Careful fastening or nailing of the cover after inspection is necessary, so that the crates will carry well and present an attractive appearance on the market.

The grades as judged by the inspector may be registered on a duplicating receipt, one-half of which is given to the grower and one half kept by the association. To mark the grades on the crates and to separate the grades in a car or to place them in different cars is no more than fair to the buyer. There certainly can be no permanent financial gain in the practice of refusing to mark the grade on the crates or in mixing the No. 2 with the No. 1 stock. Careful marking and separation tend to inspire confidence in everyone concerned, and facilitate the handling and sale on the market.

The inspection practiced by some associations is very thorough and of great value in keeping up the standard of their pack. Others have allowed the inspection to degenerate into a mere form without value.

LOADING CARS.

The importance of efficient car loading and bracing methods can not be overemphasized. Crates must be loaded compactly and braced firmly to avoid shifting in transit. The loading must be such also as to provide for a proper circulation of the cold air throughout the refrigerator car.[1] After the car is properly loaded it is imperative that the load should be braced securely. An examination of cars at the markets shows that a large amount of the damage in transit is incurred through inadequate or carelessly installed bracing. Inadequate bracing is usually due to the desire to save expense by using a small amount of lumber, which often proves to be poor economy.

SUMMARY.

1. The best of marketing facilities can not overcome the handicap of inefficient picking, grading, and packing methods. The unsatisfactory condition and grade of strawberries frequently found on the markets indicates a great need for standardization and better handling methods.

2. The first step in marketing is to engage an adequate supply of competent, dependable labor, before the picking season begins.

3. It is necessary, also, to provide competent supervision for the pickers before they are sent into the berry field.

4. The proper stage of ripeness for harvesting strawberries depends upon the variety and the distance to be shipped, but it varies from about three-fourths colored to a full-red color. Growers and shippers who trace occasional shipments to market can determine whether the fruit is being delivered to dealers in the best possible condition as to ripeness.

[1] U. S. Department of Agriculture, Markets Document No. 8. Factors in transportation of strawberries from the Ozark section, by V. W. Ridley. 1918.

5. Strawberries properly picked are pinched off the vine with a stem about three-eighths to one-half inch long, and carefully placed—not snatched off and tossed or thrown into the boxes. Many pickers require instructions as to the proper method of picking.

6. Trays for carrying the berry boxes into the field are best made light in weight, substantial, medium in size, and built so that the boxes fit into them snugly.

7. Long exposure to the sun, rain, or dust, either in the field, at the packing shed, or while being hauled to the loading station, will injure the picked strawberries.

8. Under most conditions the removal of undesirable berries from field-run stock will be as much hand grading as will be found practicable. Avoidance of unnecessary handling is advisable.

9. Whether or not the berries have been graded, the filled boxes should be classified as to quality before they are placed in crates for shipment.

10. Depending upon conditions, strawberries may be graded either in the field by the pickers or in the packing shed by special labor. Packing-shed grading is usually the most practicable and efficient method.

11. Fixed, uniform strawberry grades are very desirable as a guide and basis for the use of growers in preparing their crop for the market, of buyers in the purchase of fruit, and of inspectors at the point of shipment or destination.

12. The important factors to be considered in strawberry grades are size and quality.

13. Boxes should contain a uniform grade of berries and be filled so that they are neither slack nor so full that the berries are likely to be crushed. It is advisable to place the fruit under refrigeration as soon as possible after it is packed.

14. Careful supervision at the packing shed is of vital importance; so also are the location, plan, and cost of the packing shed.

15. The crates in most general use for strawberries contain 24 or 32 dry quart boxes. Crates holding 16, 20, 24, 30, or 32 pint boxes, and 16, 48, or 60 quart boxes also are used. New, clean, attractive, strongly made crates are best, because the selling price of berries is affected when they are offered for sale in damaged or unattractive packages.

16. Demand for standardization of the capacity of containers for berries and other small fruits has been insistent. Since November 1, 1917, it is not lawful to use any boxes or other containers for interstate shipment except those having a capacity of a dry half pint, dry pint, dry quart, or some multiple of a dry quart, for small fruits,

berries, and vegetables. Even in local or intrastate marketing it is likely to be detrimental to growers and shippers as well as to dealers and consumers if other than these standard boxes are used.

17. Growers and shipping associations that wish to build a reputation for well standardized grades of berries may use brand labels pasted on the ends of crates to good advantage. The Federal food and drugs act requires that all crates of berries be marked with a statement of the quantity of the contents. If the variety, the grade, and the grower's name and address are also neatly marked, the prospective buyer will have confidence in the product.

18. A rigid system of inspection at the loading stations is a prerequisite to the permanent success of shipping associations.

19. Most of the strawberry-shipping sections would be benefited greatly by adequate car loading and inspection sheds.

20. For safe carrying, crates must be loaded in the car compactly, with ample provision for the circulation of cold air, and braced firmly to avoid shifting and damage in transit.

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