

UNIVERSITY OF MISSOURI

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

COLUMBIA, MISSOURI

CIRCULAR 1

JUNE, 1926

PICKING, PACKING, AND SHIPPING APPLES

T. J. TALBERT AND F. S. MERRILL



Harvesting, grading, and packing apples.

The fruit grower's problems do not end with the production of a high quality product. In fact, to many growers, picking, handling, packing, and selling problems are the most difficult of all. The harvesting season may bring more grief and worry than all the other operations combined. Some of the elements of risk are beyond control and to these we become more or less accustomed. There are, however, factors that can be affected by efficient management and to these the grower should apply himself. Careless management

and wasteful practices may increase the cost of harvesting and thus eliminate all chances for profit.

PICKING

When to Pick.—A study of apple harvesting methods under Missouri conditions shows that in general growers do not pick enough of their apples at the right time, thus allowing a considerable percentage of the fruit to be immature or more often over-ripe. As a rule there is also too much delay between the time of picking and storage.

The limits on either side of the proper time to pick apples may be recognized by a careful study of the particular variety at the period near the harvesting time. It is a well known fact that fruit should never be picked before it has attained fair size and color, because it will not keep well in storage and the producer cannot market the product to advantage. In the sale of apples there is no one factor that counts for more than good color for the variety. It is also important that full size be reached if possible. Early apples are sometimes picked green to supply a demand at good prices. Such apples are generally consumed quickly, however, and if shipped long distance are handled in refrigerator cars.

When apples are left on the trees until they begin to drop, they are generally too ripe for long distance shipments, and they will not keep in a satisfactory way in either common or cold storage. If apples are to be disposed of locally they may usually be left on the trees longer to attain greater ripeness than if picked for storage or distant shipment.

There are many indications or signs which growers use in determining the proper time to pick apples. Most of these are unreliable. When the seeds turn brown may be an indication of ripeness, although with some varieties the seeds may develop a brown color long before the apples are ready to pick. Neither is the development of a red or other color characteristic of the variety always an indication of ripeness. The ease with which the stems of the apple may be separated from the twig may be an indication of ripeness, although this is sometimes deceiving. It may be necessary for the apple to develop a proper flavor or taste; good color may be required; the green ground color under the skin of the apple may develop a tinge of yellow; and the apple may be moderately hard or soft at the proper picking time, depending upon the variety. To determine the right stage for picking apples the grower must make a very careful study of all factors which go toward the making up of maturity or ripeness.

Professor A. E. Murneek, of the Missouri College of Agriculture, while employed at the Oregon Station, invented an instrument known as a pressure tester. By its use the hardness or softness of apples and other fruits can be determined with fair accuracy. This pressure tester is now being used by many growers and experiment station workers of the Pacific Northwest. Workers of the U. S. Department of Agriculture have made certain modifications of the Oregon model and it is being introduced to growers and investigators.

Holding Apples in Storage.—If for any reason, such as better price, shortage of cars for shipment and the like, it is necessary to hold apples after packing, they should be immediately placed in clean, cool storage. This is true because apples piled on the ground in the orchard or under the trees ripen very rapidly, causing over-ripeness and decay to follow before the proper disposition of the fruit can be made. The fruit may ripen and decay as much in a week or ten

days in the orchard as it would in cold storage or good common storage in 2 or 3 months or longer. Apples will soften and ripen more rapidly off the trees than on them although held in the orchard or packing shed at the same temperature.

How to Pick.—The quality and appearance of good apples requires careful hand picking. Bruises and stem punctures should be guarded against in placing the apples in the picking receptacle. The picker may by an upward turn and twist pull the apple from the twig, leaving the stem on the fruit. It is important that the apple be picked with the stem attached. When the stem is removed an opening is made in the skin which may induce early decay. Some growers even instruct the pickers to handle the apples as carefully as eggs, because the slightest bruise will often hasten decay, injure the appearance and lessen the value of the product. On beginning work, picking crews should be given detailed explanations regarding care in picking and handling the fruit.

Picking Equipment.—There are many types or kinds of picking receptacles such as picking baskets, bags and pails. Any of these receptacles should be satisfactory if the pickers use judgment and care in their use. An advantage is claimed for the pail because careless pickers may be detected by the sound made when apples are dropped into it. Buckets and baskets are usually equipped with hooks for hanging the receptacles on the limbs of the trees or on the rounds of the ladders. Picking bags are suspended from the shoulders of the pickers, allowing them the free use of their hands.

Ladders.—Many different styles and types of ladders are in use. In general most types are satisfactory. For small trees the low, three-legged ladder is usually most serviceable, while for taller and larger trees the long, pointed ladder may be used efficiently. Common ladders of various lengths are also employed with good results. To prevent slipping it is often advisable to have the bottom of the ladders shod with iron spikes. It is important with all ladders that they be as light and durable as possible. Their proper use will prevent much injury to the trees by keeping the pickers from climbing among the branches, rubbing off fruit spurs and puncturing the bark of branches with the heels of their shoes.

Lug Boxes.—The fruit from the picking receptacle is often emptied into what is known as a "lug box" which is used in hauling the fruit to the packing plant. These boxes should be strong and durable and wide enough to enable the picker to lower his receptacle to the bottom in emptying the fruit. The ends of the boxes should also be equipped with grooves cut into them to make handling easier. If the ends of the lug-boxes are raised above the sides, they may when filled be placed one above another without danger of bruising the top layer of fruit.

Handling the Picking Crew.—In a large orchard a foreman is necessary for the most efficient work. It may be well to have a foreman for every six or eight pickers. The foreman must for satisfactory work use tact and discretion in the handling of the pickers. He should be able to readily detect differences in the personality of pickers and be able to adjust these in a way most suitable for the accomplishment of the task at hand.

In general, growers find that if the pickers are paid by the day or hour better results are secured than if paid for the amount of fruit picked. When the pickers receive pay for the quantity picked, they are more likely to rush their work and become careless in handling the fruit. As a result a large

quantity of apples may come to the packing table damaged and made unfit for storage or the best grade on the market.

The foreman may profitably emphasize to the pickers these and other "don'ts":—

1. Don't break off the fruit spurs.
2. Don't pull the stems from the fruit, as the stems should always remain on.
3. Don't injure the fruit with stem punctures.
4. Don't pull the apples; remove them by an upward turn and a slight twist.
5. Don't drop the fruit; carefully place it in the container.

The number of bushels picked per day by each worker will vary greatly. For apple trees from ten to twenty-five years old, depending on the crop and the variety, pickers should average from about 30 to 75 bushels a day. In most orchards, however, the average is nearer 30 bushels a day. Such factors as height of trees, levelness of ground, ladders, and other equipment, may play an important part in facilitating picking operations.

GRADING AND SIZING EQUIPMENT

Mechanical sizing machinery is now generally used throughout the country in commercial apple growing districts. These machines are capable of doing the work more accurately and quickly than is possible by hand. By their use it is also possible to reduce the expense of these operations. Their adoption and use, however, by the grower will depend upon the quantity of fruit to be handled, the disposition and sale of the fruit, the grades to be adopted, the ability to procure skilled and common labor, and other problems which may be as important, or more so, than the ones mentioned.

In the selection of a mechanical sizing machine, the grower should carefully consider a number of important points. Chief among these may be mentioned the following:

1. A grading chute long enough to permit the graders to examine carefully each specimen.
2. The machine should be heavy and strong enough to be durable and lasting and if the parts subjected to greatest wear can be replaced readily, all the better.
3. It is an advantage to the grower generally if the machine is equipped with both hand and motor drive. Machines requiring a great amount of power may not be economical.
4. Floor space for the machine should be given careful consideration, and the price should be proportionate to the capacity.
5. The principal objection to machines sizing by diameter is that irregular apples are not sized properly.
6. The most accurate method of sizing is by weight. The disadvantage, however, is that machines sizing by weight are more complex, higher in price, and slower in doing their work.
7. The cost for grading and sizing apples using standard machinery usually varies from about 3 to 5 cents a box.

Sizing Board and Sizing Rings.—Where a sizing machine is not in use, the beginner will generally find the use of a sizing board or sizing rings of great value in all packing operations. These devices are cheap and useful in teaching the packer to recognize and sort the various sizes of apples. The experienced packer will also find them of assistance when kept close at hand as an aid in

occasionally checking up his work to maintain the proper standard. Sizing rings can usually be obtained at reasonable prices at harness shops where they are sold as harness rings, while sizing boards may be made at home or procured at carpenter shops. The circular openings of the board and size of the rings should vary from 2 inches to $3\frac{1}{4}$ inches. A sizing board is shown in figure 2.

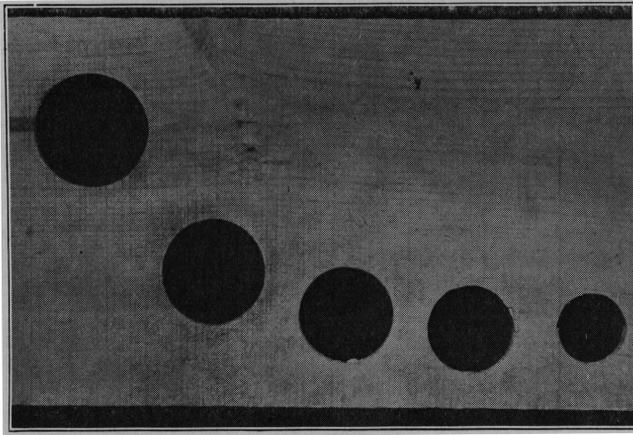


Fig. 2.—Apple sizing board.

APPLE BULK SHIPMENTS

The past few seasons have shown a marked increase in the shipment of apples in bulk or without containers. The fact that this practice has shown an increase tends to prove that it has presumably been profitable to the growers who have accepted it. The principal influence which has caused apple producers to dispense with containers and trained packing crews, has undoubtedly been increased cost of production. The marketing of apples in bulk calls for a lower permanent investment in harvesting equipment and also for a lower cash outlay for labor involved. For the growers who are satisfied with the cash returns from bulk shipments, these considerations have a strong appeal.

No doubt for the reasons mentioned there will continue to be for some time at least small quantities of apples shipped in bulk. This will be particularly true where growers have had experience and been successful with the method. The general tendency of bulk shipment, however, will be to lower grades and standards. Likewise the grower of bulk apples can hardly be expected to be as vitally interested as he should be in the production of high quality apples at the lowest possible cost. He is more likely to be interested in the production of a large quantity of apples of medium to average grade and quality at the lowest cost. It will also continue to be true that 90 per cent or more of our apple producers will be forced to adopt other methods for handling their apples.

There is no profit, as a rule, in the production of a medium or average grade of fruit. Moreover, on account of the extra worry and work required to produce good fruit, a few may be expected to grow apples fit only for bulk shipment. It will always pay to raise the largest crop possible of high quality apples on a given acreage at the lowest possible cost. The apple producers who

are staying in the business and who may be counted upon for success through a series of years have not been shippers of bulk apples. They have been the growers of the highest grade and quality fruit and such producers have constantly striven to grow the crop better each year.

Sorting Table and Its Location.—In handling bulk grades a single chute table is frequently used. Four rows are picked at one time, two on either side of the middle, in which the chute table is placed. The table is placed so that six trees in each row are picked in each set, three behind and three in front of the table. The pickers pour the apples directly upon the sorting table, where the established grade is run, and the sorted fruit is hauled directly to the loading station. This method reduces fruit handling to the minimum and bruising is not so likely to occur. Where "orchard run" bulk is the rule, necessitating the removal of only the "rots and knots", one man at the chute with a sorter on either side of the table can run a large quantity of fruit per day. A crew of this size is common in orchards which are not required to load over three cars per week. By increasing the number of sorters the total amount of fruit handled can be almost proportionately increased.

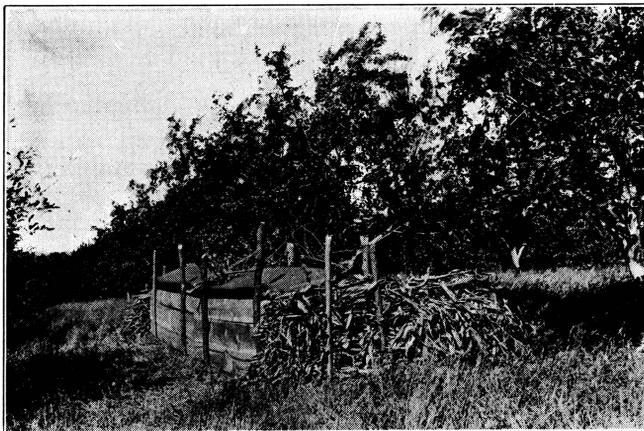


Fig. 3.—A temporary storage for holding bulk apples for a few weeks until ready for shipment or until prices advance.

Table Equipment and Handling Methods.—The table should have a heavy canvas apron so that the fruit may be lowered carefully into the container or hauling package. The need for careful handling of the fruit is as essential in bulk grades as in any other type of marketing and its importance cannot be over-stressed.

The number of tables required will depend more upon the total number of carloads that must be graded in a given length of time, than upon the size of the orchard. If the crop is composed of a large percentage of one variety, the period during which it is in the best condition for picking and handling will be limited. For best results the crop should be harvested when it has reached the proper stage of maturity. One orchard may, therefore, call for a larger force than another orchard of equal size, but consisting of several varieties with different periods of ripening.

The fruit as sorted should be run into a container so as to facilitate hauling and handling at the car. The practice of pouring the sorted fruit into a wagon box for hauling to the cars is one that, happily, is fast going out of practice. Besides the actual bruising and injury to the fruit itself, this method calls for extra handling and added expense.

Grading Machinery.—Since the grades and standards for bulk apples are not as high as for packed fruit, the use of grading machinery and other types of harvesting equipment is hardly advisable. This does not mean that bulk grades and standards should be lowered and that cultural practices can be slighted. To keep a place in market demands, bulk grades should be faithfully maintained, but comparative returns do not call for or justify an expense equivalent to those incident to grading for barrel, basket or box packs.

Sorters and Their Work.—In the grading of bulk apples, the sorters on either side of the table remove the fruit that does not meet the standards of the grade. These are sometimes sorted into baskets and then poured into piles. This practice calls for rehandling when the culls are to be loaded. Since the culls seldom bring a very high price, the extra cost of rehandling may make it unprofitable to handle them in this manner. If, on the other hand, the sorters throw the culls into a container, these can be loaded and handled more quickly and easily. Where any quantity of fruit is being sorted the extra cost required for the containers will be more than offset by the saving in labor. The man at the chute should remove any defective fruit that has not been removed by the sorters. It is his duty to regulate the grade and to maintain a uniform quality in the grade.

Resetting the Sorting Table.—After the fruit has been picked and sorted from all the trees in the "set," the table is advanced the space of six trees and another set made. To aid in this a pair of old cultivator wheels is sometimes attached to the back end of the table. In general for bulk grades the lighter the table, which can be used efficiently and effectively, the less the cost and the simpler the work. In placing the table, the slope of the ground should be taken into consideration, and if the ground is very uneven it may be necessary to carry a spade to assist in leveling the ground.

How to Make a Chute Table.—A type of chute table that has met with general approval for bulk grades can be made as follows: The dimensions are 3 feet to 4 feet wide at the back, tapering to 12 inches or 18 inches at the front. The sides of the table may be of any desired length, but one 8 feet long will meet the average requirements for a medium sized table. For sides and back 1"x6" lumber should be used, braced across the bottom, with 2"x4" pieces attached to the legs. The front or chute end should be 2 feet 6 inches to 2 feet 8 inches above the floor. This will be high enough to permit the use of a barrel. On a table 8 feet long, the back should be from 8 to 12 inches higher than the front. This will cause the fruit to roll toward the chute, and in rolling nearly all of the surface of each fruit will be exposed and defects can thus be readily detected.

To the rear of the table a step should be attached. Upon this the pickers may stand and the fruit can be placed upon the table more easily and carefully. The slats should be placed far enough apart so that leaves, broken fruit spurs, twigs and trash may fall through readily. Two types of slats are used—half rounds and flats. The former are preferred as they are stronger and the fruit rolls more readily along the grooves. These slats should be nailed so that they converge towards the lower end and the nails driven in with a nail set

so that no part of the head protrudes. The back portion of the table should be heavily padded. This tends to eliminate bruising when the pickers pour the fruit upon the table. The use of heavy canvas as a covering is to be recommended because of its durability.

Bulk Apples by a Successful Missouri Grower.—W. H. Baker, New Franklin, Missouri, a successful commercial producer has had several years of experience in handling a small portion of his crop as "bulk apples." His statement regarding the picking, hauling, loading, holding in temporary storage and sale of bulk apples is as follows:

"Apples may be profitably sold in bulk without packages. The local trade may take them or they may be shipped several hundred miles to consumers who are unwilling to pay the high cost of packages and packing, but are willing to accept apples of somewhat lower grade or less perfect condition.

Bulk apples should be graded well enough to insure some uniformity and to make possible a fairly accurate description of the grade. All rots, soft bruises, knots and very small apples should be discarded or placed in a cider grade. Apples less than 2 inches in diameter should usually go as ciders, although the local trade will sometimes take them in the smaller varieties.

Bulk apples which are to be shipped by rail should be handled so as to avoid unnecessary bruising. They should be shipped in refrigerator cars if possible, either iced or not, according to weather conditions. If they can be cooled to 50° F. or lower before loading and the weather is not excessively hot they will hold up reasonably well without ice. The false floor may be raised to the sides of the car or left in place but in either case the floor should be covered with cheap building paper to keep the fruit clean.

Loading a car of bulk apples is rendered easier by the use of two movable, shaped bulkheads, each made by nailing grain doors to a piece of fence post or a 2" x 4" about 4 feet long. These should be placed at the ends of the car with the points of the V's toward the middle of the car and the tops of the V's resting against the sides of the car. These bulkheads are held in place by cleats nailed to the floor and, as the spaces behind them are filled, the cleats are pried up and the bulkheads dragged toward the middle of the car and re-fastened. Care should be used to leave the floor covering in place. When the car is fully loaded the bulkheads are firmly secured to prevent further movement.

Sound, hand picked apples may be held in the orchard several weeks after picking and still be suitable for the bulk trade if the nights are cool enough to cool the fruit within a day or two after picking. It sometimes happens that the market is flooded with bulk apples at picking time. Due to the efforts of the growers to get rid of their culls and other low grade fruit, the prices are correspondingly low. As soon as this flood of low grade fruit is worked off, the prices generally tend to advance and are sometimes 20 per cent to 25 per cent higher within 3 or 4 weeks. For the grower who believes he can do better by holding his bulk apples, the following suggestions may have value:

Select a fairly level, well drained location on which a rick 8 to 10 feet wide may be built. Remove any brush or coarse weeds and cover several inches deep with clean straw. If the apples must be handled by men standing on the ground, plan to make the rick about 8 feet wide by making ridges of straw piled thicker at the sides to keep the apples from rolling off the straw. If the

apples can be dumped from a wide truck or wagon, the rick may be made 10 feet wide and may even be built up by having sides 1 to 2 feet high made of lumber. Grade the apples as for shipment and pile in an even symmetrical rick, being careful to avoid bruising. Have plenty of help. One or two men should stand on the ground and let the apples pile up around them; other men pass them the crates or barrels and assist in dumping.

Cover the rick with a temporary cover of canvas (carpets or building paper may be used) and uncover at night until the fruit is well cooled; then put on a permanent cover. For this purpose various materials are used. Clean hays, such as bound prairie hay, cane hay or Johnson grass may be placed directly on the apples. If straw or other loose, chaffy material is used, the rick should first be covered with building paper or cheap roofing, the latter being preferred. This is to keep the straw and chaff from the fruit.

If roofing having an odor is used, spread it out to dry a few days before using. Some form of cheap roofing is superior to building paper, because it is not affected by rains. However, it makes so tight a cover that hot air collects at the top of the pile. Therefore, openings for ventilation should be provided every 12 or 15 feet. These should not allow straw to enter. The rick should be covered with several inches of straw or hay, which must be tied on with wires, poles or other device. If the cover is very tight, ventilation should be provided at the bottom as well as the top.

The cost of this kind of storage will, of course, vary. For two years, 1924 and 1925, the estimate on 10-car lots was as follows:

Piling down and picking up.....	10c per cwt.
Asphalted felt roofing.....	1c per cwt.
Extra labor on covers, etc.....	2c per cwt.
Total.....	13c per cwt.

In addition, the loss during the storage period was approximately 1%. The increase in price secured by holding 3 or 4 weeks was approximately 40c per hundred weight."

APPLE BARREL PACKING

Since the apple industry reached the commercial stage, the standard apple barrel has been associated with the Central West as its predominant fruit package. It has many factors in its favors. It also has its disadvantages. There has been much discussion as to the possibility of replacing it with the box pack, but there seems to be little likelihood of this happening at the present time. Some of the criticisms of the barrel-packed fruit cannot be charged so much to the package as to the fruit that has been packed in it. That there is need of a radical improvement in barrel grades goes without saying.

However, the barrel, as a package, will continue to hold an important place in the central western markets and its use will be continued as long as the net returns to the grower are equal to or exceed those from the use of other types of packages. The barrel is primarily a package for storage, and the growers should limit its use to grades that are suitable for holding as long as the period prescribed for the variety.

Packing Tables.—There are two types of tables in common use among growers; one a chute table somewhat similar to that described for bulk grades and another called "canvas top" or "flat topped" table. The chute table is

more commonly used than the latter, but some growers who have established a reputation through the quality of their pack are partial to the canvas top table.

The chute table used for barrel packing should have a division board as shown in figure 4. This will reduce the cost of handling the grade lower than the barrel grade, since the sorters can pass the fruit of this grade directly into this compartment. In this way, the expense involved in resorting, a necessary practice where a double chute is not used, is avoided. The opening or chute must be narrower than described for the bulk grades. This limits the number of apples that can pass at one time and the packer can grade more accurately. An opening ten inches wide will permit three apples to run through at a time and there are very few men who are capable of handling a larger number. As a matter of fact, one of the main objections to the chute table is the fact that it is rather difficult for even a trained packer to be sure of the grade he is running. A smaller chute or opening is generally very essential.

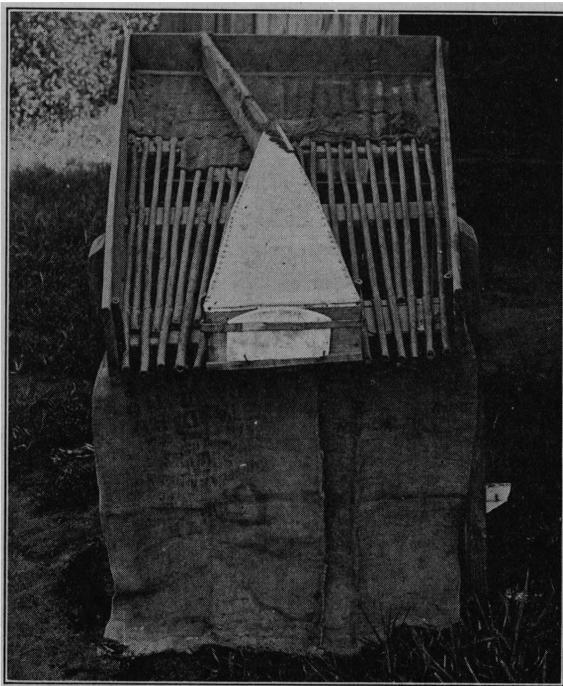


Fig. 4.—A home-made apple packing table. Note the rubber hose in bottom and two compartments for different grades.

Operation of the Chute Table.—In operating the chute table, it is customary to have at least three sorters. Two of these work on the right-hand side of the table. This side comprises approximately two-thirds of the table area and is used for running the predominant grade. With well grown specimens, this should be the No. 1 grade. However, if the quality is poor, and shows a smaller percentage of No. 1's than No. 2's, it is economy to sort out the No. 1's and pass them over to the left-hand compartment. In other words, try to reduce handling the fruit to the minimum and run the grade of which there is the larger percentage. One sorter stands near the upper end of the table and may use a platform or box upon which to stand. This is a necessity with large tables as they are often $4\frac{1}{2}$ ft. high at the upper end. This man should remove all leaves or twigs and any fruit that is obviously below the second grade.

The culls should be put directly in barrels kept and used only for this purpose. This holds true whether the fruit is being packed in the orchard or at a central location, because the cost of rehandling should be avoided wherever and whenever possible. It is usually best to have each sorter assigned to a special class of sorting. This avoids confusion and the specialization tends toward greater efficiency. The second sorter stands near the lower end of the table leaving about two feet of open space between him and the chute or opening. He should roll the fruit down the table. This rolling operation exposes a maximum amount of the surface of each apple and enables the sorter to detect blemishes quite readily. He should remove any of the culls or cider grade which the first sorter may have missed. He should also sort out the second grade and pass them over to the left-hand compartment, which should be padded at the upper end to avoid bruising the fruit as it is passed over.

If the work of the sorters has been carefully done, only a small percentage of inferior fruit should come to the packer. As the fruit rolls down the last two feet towards the barrel, the sorter should be able to detect practically all fruit that is defective and below the grade he is running. If the quality of the fruit is good and a trained crew is used, there need be no fear of a poor pack when a chute table is employed.

The value of trained sorters is often underestimated, however, and this one fact often leads to dissatisfaction, both as regards efficiency and uniformity of pack. It will nearly always be more economical, in the long run, to pay a higher price for a skilled sorter than to try to economize in this matter. The packer, primarily, should be responsible for the quality of fruit in the package, but he cannot work efficiently unless the apples have been properly sorted.

As stated above, it is important that each sorter have a definite part of the work to perform. This avoids overlapping responsibilities and inferior workmanship. If the second grade comprises only a small percentage of the total, the third sorter can often combine both the sorting and packing. He should remove all culls and any of the better grade that may have been passed over by the other sorters. The latter should be passed back to the other side (not dropped into the No. 1 barrel) for reinspection. The culls should be tossed into a barrel kept for the purpose. This type of crew should be able to sort from 100 to 125 barrels per day of barreling grade, if the fruit is of reasonable quality.

By the addition of another sorter and another packer, the latter to run the number two's, the output of a table can be increased. In this case, the third sorter will have to help select facers, for very few can select their own and face over 125 barrels per day. Runs of over 200 barrels per day for a double chute table are not uncommon, with good specimens and larger sizes, but an average of 125 barrels with three sorters and one packer or 160 with four sorters and two packers is a satisfactory day's work.

The Double-Chute Table.—The double-chute table is usually made five feet wide at the back end, tapering to thirty inches at the front. In order to make the double opening required, two 6-inch boards about 20 inches long are nailed together to make a V. These are firmly nailed to the table having the wider end toward the front as shown in figure 4. This end is boarded over and the top may be covered, or the space thus made may be used for tailers that are selected by the head sorter. If it is used for this purpose the bottom should be padded to prevent bruising, and the end gate hinged so that the fruit may be rolled into the barrel when ready to fill.

Moving the Table.—The table should be strongly braced on all sides, as it is required to support a heavy load. Such a table is necessarily quite heavy and moving through the orchard involves considerable labor. To overcome this difficulty and to reduce the time frequently lost in arranging each set, several contrivances have been devised. One of the most practical of these methods has been used with satisfaction and economy in the Connett Orchards in Buchanan County, Missouri (Fig. 5.). Mr. Frank Connett describes it as follows:

“We use a sled, with a turntable top, fastened with a chain behind a hay frame. The sorting table is fastened to the turntable top of the sled and can be turned so as to take advantage of the slope of the ground. The packages, barrels, or baskets, are carried on the wagon. We pick four rows of trees at a time, two on each side of the sled. When the pickers get two or three trees ahead, we move our outfit up a little. In this way, the apples go directly from the tree

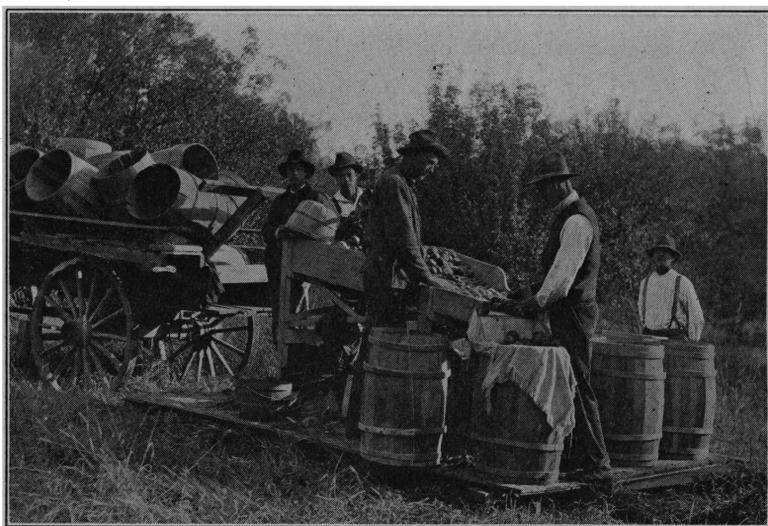


Fig. 5.—Grading apples on an orchard sled, which is a time saver in orchard packing.

to the sorting table and the pickers do not have to carry them far. It takes very little time to move, using an outfit of this kind. With competent pickers, paid by the day, we can pick and pack about 125 barrels per day at an average cost of about forty cents per barrel. Of course these figures will vary some, depending on the size and quality of the crop.”

Advantages in Operating the Chute Table in the Orchard.—1. The apples are handled only once; that is, the picker empties them direct from the picking sack to the sorting table.

2. The apples are packed, headed up and put aboard the cars within a very short time after picking.

3. Men paid by the day will handle the apples with more care and take better care of the trees than men paid by the bushel.

The runners are 2"x6" or 2"x8". The cross pieces are 2"x6", spacing the runners five feet apart. The top is made of one-inch boards projecting

18 inches over each runner, making the top eight feet wide and 12 feet long. See figure 5, which shows this table in operation.

Flat-top Canvas Table.—Unless the fruit is of good quality some growers question the possibility of putting up a strict pack with the chute type of table. Consequently some recommend the canvas flat-top table. The following letter from a grower who has used this type of table for many years sets forth the advantages of this type.

“The writer contends that the flat-topped canvas table is without doubt the most efficient, as well as economical, type of packing table used. First, I have found it essential that we make two grades of barreled apples to compete with the Northwestern boxed apples. By using the canvas flat-top table, the packers can sort the 1’s and 2’s more accurately than from any other type of grading table. The sorter may pick up six apples: three No. 1’s, two No. 2’s, and one cull. At a glance he classifies them and places the 1’s in one basket, the 2’s in another and the culls in the bulk or cider crate or barrel.

“If you are packing your No. 1’s, 2½ inches and up, showing a high color, with the No. 2’s from 2¼ inches up with a fair color for the variety, select fruit meeting this grade and place it in the proper baskets. The baskets, when filled, are passed to the inspector, who carefully empties them into the barrels. He may find in the sorted No. 1 basket, three apples that should go into the No. 2 barrel. These he can easily place in the right barrel. The point is: if you are selling a car of apples, whether it be 1’s or 2’s, when you show the buyer a barrel and can assure him that there are 159 more in the car *just like it*, you have no trouble making the sale and at a top price.

“I cannot recommend this type of packing table too highly, as I know that if the growers of the Missouri River section will pack their apples in dependable grades they will go on the market and outsell the Northwestern box apples.”

Best Size of Canvas Flat-top Table.—The best size of the canvas table is 14 feet long, 3 feet wide and 34 inches high. The length is subject to change, but the height and width should be as stated. The canvas is stretched over the frame tightly. A 1”x8” board is nailed on each end and one in the center to set the baskets on. The sides and ends of the table are 1”x6” and the legs are 2”x4”, with 1”x6” bracing boards. The table is light and inexpensive.

The grower is usually partial to the equipment to which he is most accustomed, but a consensus of opinion seems to show that the chute table permits of somewhat greater speed in handling fruit of good quality. However, this factor is one that causes the most complaint against its use with fruit of poor or medium quality. The very fact that each fruit is not inspected individually makes it possible for defective fruit to pass even careful and skilled operators.

Those who have used the flat-topped table hold that with its use a much higher grade can be established, since each fruit is graded on its individual merits. Where the help is trained properly, they soon attain quick judgment and the fruit can be sorted both speedily and accurately.

Baskets Used for Grading.—The baskets used in grading are half-bushel, splint-stave, oak baskets with a swing bail. These can be lowered into the barrels and the contents poured out without any need of bruising. This is also the type of basket most commonly used for selecting facers and tailers.

HARVESTING AND PACKING METHODS

With the barrel, as with other types of packages, the grower has several factors to consider in arranging for his packing operations. Experience has shown that it is probably more efficient and more economical to grade bulk apples in the orchard; the pickers placing the picked fruit directly upon the packing table. Under certain conditions, many growers have come to believe that where the fruit is packed in containers—whether in barrels, baskets, or boxes—it is better to use a central location for the packing operations. This may hold true where the fruit is produced on a commercial scale, but it would not be as advantageous for fruit grown on a limited scale. A comparison of some of the advantages and disadvantages of the different methods follows:

Grading Apples in the Orchard

Advantages

1. The apples are poured directly from picking sacks upon the packing table, reducing handling to a minimum.
2. Bruising that may be caused from pouring into barrels is eliminated.
3. Hauling, with resultant delays, is avoided.
4. Injury due to bruising that may occur when apples are hauled loose is done away with.

Disadvantages

1. Frequent sets are required, reducing efficiency and increasing expense (most marked with a light crop.)
2. Packed fruit scattered over the orchard may require an extra man for hauling. It may be damaged by exposure to the elements or may be overlooked.
3. The barrels are stained or discolored by rolling over grass and dirt and the fruit inside may be coated with dust.
4. The work is disagreeable in bad weather and on hilly ground it is difficult to level the equipment.

Central Location

Advantages

1. A centralized location permits better organization of forces and equipment.
2. No delays are necessary as packers are permanently located.
3. It is more economical where the fruit is packed in containers.
4. Where more than one table is used, supervision is easier.
5. By using temporary flooring, the package can be kept clean.
6. Packed packages are not scattered.

Disadvantages

1. Requires extra hauling of fruit.
2. A large supply of lugs or barrels are needed.
3. Packages are exposed to weather.
4. Lower grades are exposed to the weather.
5. The work is disagreeable in inclement weather.
6. A reserve supply of fruit is not practicable.

Packing Shed

Advantages

1. Packers (highest priced help) need not be delayed as in moving from one set to another.

2. Neither fruit, packages nor packers are exposed to the weather.
3. Lower grades are not exposed and can be handled more efficiently.
4. Reserves may be maintained so that the packers may be kept busy during disagreeable weather.
5. Centralization allows the most efficient management for convenience to supplies and permits the use of labor saving devices and mechanical appliances.
6. The packing shed is most economical for the packed fruit.
7. The packages may be kept cleaner.
8. Personal supervision is made less difficult where more than one table is used.

Disadvantages

1. Cost of shed (offset to some extent by its value as a storage for packages).
2. Fruit may be damaged by additional handling and hauling.
3. A large number of picking containers are required.

Since the problems in every orchard are generally different, it devolves upon each grower to work out the system best suited to his individual needs. These advantages and disadvantages cover conditions in general, and represent a study of operations under widely varying conditions. They are presented, therefore, as a guide and not as a set basis for all operations.

GRADES AND STANDARDS FOR APPLES

It will not be the purpose of this publication to add to the list of "Prescribed Grades and Standards." The improvements made have been the results of educational work rather than legislation. Nearly all will agree that there is a need for an improvement in our grading. As our methods of production have improved so there is a tendency towards more careful grading of our fruit. The chief reason for better grades is that it pays, not merely in the satisfaction derived from a good job well done, but in the actual net cash returns.

In the handling of fruit for the market, the commercial growers have a choice of several types of packages, to each of which may be adapted a number of styles of packing. These may call for a different degree of mechanical skill and practice, but from them one may select a combination that will give satisfaction. After a grower has decided upon the manner in which he is best suited to handle his crop, he should decide upon a definite plan of action to which he intends to adhere.

Importance of Uniformity.—There is no one factor, over which the grower has positive control, that can so directly influence his results as uniformity. He should reduce his practices to a definite basis and follow them. If he decides on a quality basis, he should endeavor to have all packages uniformly good. If, on the other hand, he decides on a lower standard, let him be consistent in this, too.

Standardized Packing.—The quality of fruit may vary from year to year as regards size, finish, and freedom from defects, but the standard for packing should be maintained on a uniform basis regardless of the condition of the fruit. Each package should be as nearly uniform in all respects as possible. Such a standard of packing carried on over a period of years will go far towards establishing a grower in a place of independence as far as marketing his product is concerned.

Growers Accept Uniform Pack.—There are many successful growers in Missouri who have as a result of years of experience been thoroughly convinced that a uniform pack pays big dividends. One of our foremost growers states that the uniform quality of his pack has been forced upon him. At first he was somewhat unwilling to accept it. The practice has been, however, the turning point in the successful management of his orchard. With him it is not a problem of marketing now, but of distribution, for the reputation of his pack is well known in the leading markets and fruit buyers compete for his crops. There are many theories advocated in connection with packing and marketing fruit, but the factor of uniformity has passed beyond a theory and is now an accepted fact among apple growers who have been consistent in its use.

Ultimate Returns Important.—The rewards for putting up a uniform pack are not generally manifested until the practice has become well known. To far-seeing producers, it is the ultimate returns that are most important. As the fruit industry is a long-time investment, a policy or program will be of value only in so far as its benefits are enduring. To put the seen before the unseen is business short-sightedness and the grower whose standards deviate with the seasons is not building on a permanent foundation. Uniform grading and packing require good judgment and training. An inexperienced or disinterested crew cannot be expected to do good work and the use of this type of help is often the most expensive as well as very unsatisfactory.

Appeal of Attractive Packages.—A uniform standard for the different operations should be practiced. In selecting facers, the value of uniformity is shown not only in the added attractiveness of the package, but in the ease with which the work may be done. The quality of the fruit goes a long way in establishing values, but the attractiveness of the package and packing may increase the appeal of even high quality fruit. Uniform sizes and uniform color combine two important factors. In tailing, as in facing, the fruit should be selected for uniformity of size and color. A good packer can blend the extremes of sizes and colors so that each package will approach a set standard of uniformity.

If each barrel, basket or box is nailed or secured in a uniform manner and then stenciled, using a similar type of stencil and ink for each variety, the grower can complete a satisfactory package. The value of uniformity can be summarized briefly by re quoting this statement, "If you can assure the buyer that there are 159 barrels in the car similar to the one inspected you will have no trouble making a sale, and at a top price." To carry this statement a little farther, if you can guarantee every car to be of a set standard, year in and year out, you can disregard any legislative regulations as to standards, for you will have attained a place of independence.

BARREL PACKING PRACTICES

Preparing the Barrel for Packing.—The barrel must be first prepared for packing. This operation is usually called coopering. One end is left untouched and is opened when ready to face. The other end is nailed and headlined. In nailing, the hoops are driven down until even with the chime. Two nails are then driven into each side of the head pieces. If the nails are driven in at an angle of about 60° from the perpendicular, they will hold the head pieces securely and the hoop can be removed more easily for inspection than where the nails are driven straight into the heading. The headliners, which have been softened by soaking in water, are nailed across the ends of the heading.

Four nails are frequently used, though a tight barrel may not need over three. In nailing the headliners, drive the nails at an angle of 45°. If the nails should pass through the hoop, they should be clinched as they may cause painful injuries to the hands. The bilge hoop should then be driven down tightly. One nail is usually used by the barrel manufacturer and in coopering two more are driven in, forming equal spaces between nails. The barrel is then turned over and the other bilge hoop similarly tightened and nailed.

Barrel Facing.—The facer raises the hoops on the uncoopered end of the barrel and removes the head. He first clinches the nails used in the bilge hoops, and places a corrugated cap in the bottom of the barrel. The selection of the facers calls for care and skill. They form the display window of the barrel and a package is no more attractive than its face or tail. A standard size should be selected for every barrel of the variety being packed. A standard of color is likewise important, but it affects only the appearance, while the matter of size affects directly the ease of facing.

The apples in a face should fit snugly enough so that they cannot rattle or turn. To force an apple into place will cause the face to crook when the barrel is moved. When apples of uneven sizes are used, it is nearly impossible to get a tight fit unless apples much below or above the average are used to complete the rings. When apples of uniform sizes are used, a snug fit is automatically secured.

Considerable skill is required to properly pack and face a barrel of apples. All the apples used in facing should be of uniform size and color. A much more attractive face may be made if apples are selected which fill the circles without leaving spaces or requiring one or more specimens to be placed on edge. The face is packed by beginning on the outer edge, placing the apple stems down in concentric rings until the head is covered. The center is filled with one or more apples as required for a firm and finished pack. If larger or smaller apples are used to fill the center space, they destroy uniformity and attractiveness. The following table may be used as a guide in barrel facing:

Diameter of apple	Number in face	Number of circles	Number in center
2¼ in.	48	3	3
2½ in.	40	3	1
2⅝ in.	34	3	0
2¾ in.	31	2	4
3 in.	27	2	3
3¼ in.	23	2	2

(After Sears)

Color of Facing Apples.—The color for the face should be somewhat higher than the requirement for the grade being packed. This is sometimes called a "false front" or even a plain deception. If the remainder of the barrel is filled with inferior fruit, it would deserve harsh criticism, and buyers discriminate against such as "heavy tops." On the other hand, if the rest of the barrel is filled with a high grade of fruit, equal to or better than the accepted standard it has merit. The first impression is of great importance in the sale of a commodity and the attractiveness of the product is of value. The facer usually selects a half bushel of facers for each barrel. After the face has been placed,

the balance of the fruit in the basket is gently poured into the barrel and the bright cheek of an apple placed in the spaces between the apples in the face. Double facing is rapidly losing favor. Besides being very expensive, it is not as attractive as the face described.

Value of Good Sorting.—The most important and the most difficult detail of securing a uniform pack is proper sorting. While a packer cannot change the color of the fruit, he can, by using good judgment, produce a most satisfactory blending of the colors and an even distribution of the sizes. In this way, the extremes of both are not limited to a single package. The man at the head of the chute is the final judge of the grade and he should impress upon the sorters that in case of doubt concerning an apple, it should be thrown out. The chute man should be selected on the basis of his past training and his present ability. Before the packing is started he should be given instructions as to the grade that is to be run and should, thereafter be held to it. Taking into consideration the general quality and appearance of the fruit, he should arrive at a definite standard and constantly try to maintain it.

Canvas Aprons for Tables.—The table should be fitted with a canvas apron for each opening. This apron should be two feet wide and three feet long. It is placed over the top of the barrel and cupped so as to hold about one-half bushel of apples. When filled, the apron can be lowered into the barrel without bruising the fruit.

Racking the Barrel.—When about a bushel of apples have been packed, the barrel should be racked. A few quick shakes will settle the fruit more satisfactorily than any other way. This process should be continued with each lowering of the apron until the barrel is nearly filled. Racking settles the apples firmly into place and is an essential part of packing. A loose or slack pack allows the individual apples to rattle about after they have become re-adjusted. This causes loss from bruising and if the barrel is placed on its side, both the face and tail may become disarranged.

Tailing the Barrel.—Tailing, while a comparatively new feature of packing in some districts, is one of the finishing touches to barrel packing. As in the face, the tail is placed in concentric rings, but in this case the apples are placed upon the side or cheek. Tailing is soon learned and considerable speed can be attained after some experience. The chief consideration in tailing is in arranging the apples for the foundation of the tail. By a simple turning of the apples, their height may be changed, so that the tail, when completed, is practically level on top. Like in the face, the fruit selected for tailing should be uniform in size and color, not too large, and slightly higher in color than the average. The uniform sizes facilitate the operation and improve its attractiveness. See figure 31.

While the face end is usually opened for display purposes, the tail or bottom is generally opened for inspection. Anyone who has offered fruit for sale from storage will appreciate the value of tailing barrels. Its cost value has been figured at various levels, but it is generally accepted that tailing is worth much more than its cost. In fact, many districts now consider ring-tailing as a necessary operation in packing the better grades.

The cost of ring-tailing is offset to some degree by the comparative ease with which such barrels are headed. The pressure exerted by the head, in heading, is evenly distributed over the entire tail and less damage results than occurs in heading fruit that has been "loose-tailed." This is true, not only as regards the fruit in the tail, but throughout the barrel. Instances have been

observed of heading jumbled apples where the injury from over-pressing has extended to the apples of the face.

The height of the tail will depend upon the variety of apples and their condition. Fruit that is very firm when packed will show more bruising from pressure when over-pressed than apples with softer flesh. If the fruit has been properly racked, very firm apples can hardly be tailed higher than one-half inch above the chime. Softer fruit may sometimes be tailed safely an inch above the chime.

In practice the best rule to follow is to tail a few barrels at different heights. These should be headed and then opened for inspection. A well tailed barrel will show an appreciable flattening of the cheek of each apple in the tail, but will show no bruising of the fruit in the lower levels. If such bruising appears, it can be accepted as an indication that the fruit has been tailed too high.

The grower should open a few barrels every day to assure himself that the fruit has been properly racked and tailed. Fruit from different parts of the same orchard may vary in condition and require different treatment. It is



Fig. 6.—Effective stenciling of a packed apple barrel.

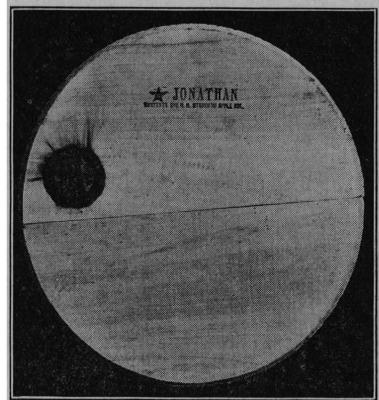


Fig. 7.—A small type of rubber stamp used for stenciling apple barrel packs.

much easier to inspect your packing from time to time each day than to make adjustments later with purchasers for an unintentional oversight or error.

Heading the Barrel.—The head is forced into place by means of a press. Two types of presses are in general use, one a lever press and the other the screw press. The better types of screw presses are usually preferred, since they allow a more even application of pressure to the head. A type called the “Blue Bird Press” has many improvements over the older presses. The block cannot turn and two stay rods hold the block level, so that equal pressure is applied to all parts of the head.

The press is first hooked under the barrel, the upper hoops driven up, and often the top hoop is completely removed. This allows the staves to spread and facilitates forcing the head into the croze. The head block is placed in the center of the head and the pressure applied to the screw until the head is forced into place. If the heading is placed in the proper position and the press used correctly, the head will slip into the croze without any need

of hammering. The hoops are then replaced and driven down until they are even with the chime. The press is then removed and the barrel is ready for nailing and lining. This is done in the same manner as described in cooping the barrels, preparatory to packing.

Stenciling the Barrel.—After the barrel has been nailed and lined, it should be turned over and stenciled or marked on the face end. This has become the custom in all barrel apple sections of the country. A certain degree of uniformity is an advantage in marking the barrels. A uniform type of stencil should be used for each variety and the continued use of an ink of certain color is advantageous. Stamping each barrel plainly and in the same relative position is one of the small points that requires no extra time or labor but helps the general attractiveness of the package.

Two types or styles are used. One is cut from brass and is slightly smaller than the size of the barrel head. Figure 6 shows a stencil of this pattern. The marking is done with a stiff brush or dauber, using a lamp black preparation. The stencil can be of any desired design, but usually includes the name and address of the grower, the grade and the variety. It may include the minimum size and should include the following, "Contents one U. S. standard apple barrel," as required under the net weight amendment of the Food and Drugs Act.

Another type of stamp used is illustrated also in figure 7. This is cut from rubber, the type being about 1 inch in height. An indelible ink and stamp pad are required. This type is usually cut to give the grade and variety only, although some growers have another stamp with their name and address.

Either type will be found satisfactory, but the use of a trademarked brand is worth while for any grower who desires to secure for himself the advantages of standardized packing and improved grading. A trademark may act as a boomerang to a person using one unscrupulously, but to a reputable grower it may become of as much proportionate value as have some of the brands of trademarks in other lines.

Use of Corrugated Caps.—The use of corrugated caps on either end of a barrel is an inexpensive form of preventing bruising. The type of pad having one smooth surface is preferred and the smooth side is used against the fruit. The use of a pad over the tail end facilitates heading and the $\frac{1}{2}$ inch of springy resistance furnished by both pads may reduce the damage where a slight amount of over-pressure occurs.

Standard Apple Barrel.—In the United States the standard apple barrel is in use. The federal law requires that it be branded as follows: "Min. Vol. 3 Bus." The diameter at the head is 17 inches, the diameter at the bilge is $18\frac{1}{2}$ inches; distance between heads $26\frac{1}{2}$ inches, all inside measurements. The standard barrel contains 7,056 cubic inches or three heaped bushels, which amounts to 105 quarts of fruit.

The approximate number of apples in a barrel is as follows: 2-inch, 900; $2\frac{1}{4}$ -inch, 747; $2\frac{1}{2}$ -inch, 595; $2\frac{3}{4}$ -inch, 453, and 3-inch 320. If the buyer can be assured that a barrel contains so many apples of a certain size, it enables him to sell them by count as in box apples.

APPLE BASKET PACKING

During the past five or six years, the use of the round, stave bushel basket for apple packing has steadily increased in the Central States. It is now used probably more extensively than any other package for handling the summer and

early fall apples. When the proper methods of packing are practiced, the fruit has an attractive appearance and the firmer fleshed fruits can be shipped long distances without serious injury.

To obtain the best results and to secure the most attractive appearance, the proper methods of packing must be followed. When the basket first came into use there was a tendency towards improper filling, with a resulting slack pack. The other extreme is the more common error now, but either condition should be avoided, since they result in bruising the fruit.

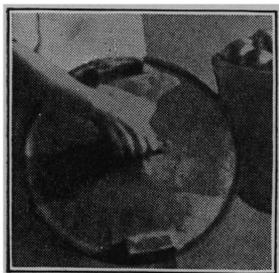


Fig. 8.—Fruit “shaper and packer.”



Fig. 9.—How the shaper is used.

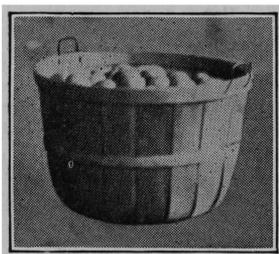


Fig. 10—After using shaper; the correctly shaped solid base is ready for “ring face.”

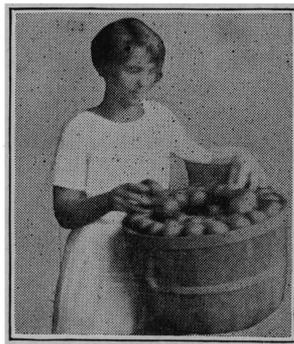


Fig. 11.—Ring-facing the basket.

Figures 8, 9, 10, and 11 are used by courtesy of Taylor Fruit Shaper Company, Anna, Ill.

Types of Basket Packing.—There are two types of basket packing now used, the “jumble pack” and the “ring pack.” The latter style consists in placing each layer in concentric rings and its use is limited to the handling of extra fancy grades of apples.

The jumble pack is most commonly used and will be the only method described. The fruit is run into the basket from the packing table and no attention is paid to its arrangement while the basket is being filled. The fruit should be handled carefully, however, to avoid bruising, and should never be allowed to fall any considerable distance into the basket.

Racking the Basket.—In describing barrel packing, the necessity of racking was emphasized, but this factor calls for even more attention when the basket is used. There have been many complaints against difficulty in keeping the “tails” in place. In nearly every case, this can be traced directly to improper racking. Where the fruit is packed too loose, it is bound to settle and the tails become disarranged. If, however, the baskets have been shaken properly, there will be no need of readjustment and a well tailed basket should arrive at its destination in as good condition as when packed.

The baskets should be racked twice while being packed; first when about half full and again when the baskets are full. A quick snap will jar the fruit into place best. If a “follower” or “shaper” is used, the last racking can be done by the tailer, thus including in one operation both the racking and the preparation for tailing.

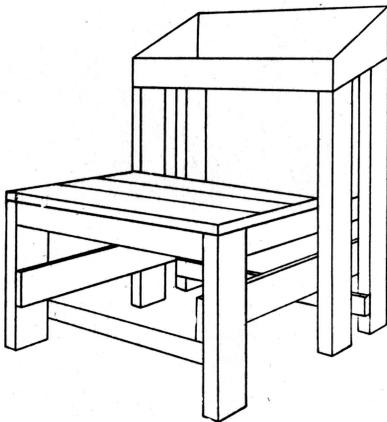


Fig. 12.—Packing bench for basket packing.

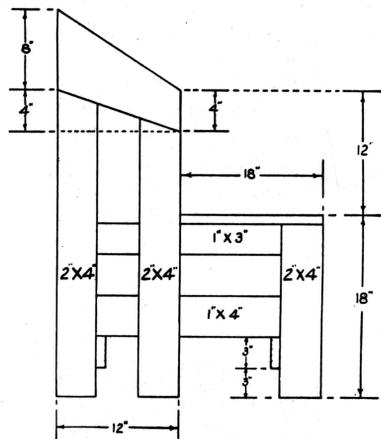


Fig. 13.—Drawing showing details of construction for the basket packing bench.

Tailing the Basket.—To meet the market demands and to secure the most effective appearance, each basket should be ring-tailed. This practice is much simpler with baskets than with barrels and any person can soon become adept in this work.

The tailing methods first used for baskets were similar to those then known for barrels. The baskets were well filled and the tailer had to build up a foundation for each apple. This required a considerable amount of skill and was quite expensive as well. Another disadvantage of this method was in the lack of uniformity in the appearance of the packed baskets, since the tailer was limited in his choice of sizes and colors to those found on top of the basket.

These extremes can be readily avoided, however, by using a “follower.” Its use facilitates the work and the appearance of the packing is improved. The follower arranges the fruit in a rather smooth layer and the tailing practice is simplified.

The follower can be purchased ready for use at a price of about \$5.00, or it may be made at home. The type most commonly used is made of heavy gauge galvanized steel 16½ inches in diameter, with a concave surface, the center being 1½ inches higher than the rim, to form the bulge. The face is covered with heavy canvas and a rubber strip is cemented around the rim.

Handles are riveted to the back near the rim and are used when the tailer is racking the fruit preparatory to tailing. This type of follower covers practically the entire surface of the fruit and when the basket has been racked firmly the fruit will be ready for tailing. The initial cost of a follower will be forgotten after a short trial, for it will increase the rate of tailing considerably.

The height of the fruit in the basket is an important detail. It must be high enough to prevent the fruit from rattling. However, if the fruit is too high, the fruit in the tail may be cut and bruised. Fruit packed at a height of 1 inch above the edge of the basket and having a bulge of 1 to 1¼ inches is generally recognized as the best. The elasticity of the lid will then hold each apple in place, but without undue pressure.

The tailing practice, where a follower is used, is reduced to arranging the fruit in concentric rings, starting on the outside and continuing until the tail is completed. Each ring should be packed tightly enough so that the apples cannot move or rattle. In completing the ring, the last apple is put in place with a rolling motion, holding the two apples slightly apart to increase the opening. The elasticity of the basket will then hold the ring in place. If a follower with a concave surface has been used, little attention will need to be given to the bulge, for the fruit has been arched by the concave surface of the followers, producing a bulge automatically. Where even a few hundred baskets are packed annually, it will be a great saving in time and labor to invest in a follower or shaper. See Figures 8, 9, 10 and 11.

When basket packing is done on an extensive scale, a bench or elevated platform may be used, since it puts the basket at a convenient height. Figures 14 and 15 show the construction of a special type of packing bench adapted for basket packing. The hopper is filled with the selected tailers, and the padded, inclined bottom keeps the front filled, where the apples are within easy reach. The bench is solidly braced and is solid enough to allow thorough racking in the preparation for tailing. This bench will accommodate two tailers and may be equipped with a folding rack on either side for holding the lids. By placing a shelf under the hopper a compartment can be made for holding the corrugated pads.

Basket Pads.—Corrugated pads or caps should always be used on baskets. They prevent bruising and rim and lid cuts. A pad 19 inches in diameter will also protect the outer ring of the apples, as it heads down over the fruit when the lid is put in place.

Fastening Basket Lids.—Improper fastening of the lids has caused many complaints and the call for attention to this detail cannot be over-emphasized. Even in well loaded cars, there is some movement of the baskets and poorly fastened covers will come off and the contents will be spilled.

Where the baskets are to be loaded in a carlot shipment, the wire handle can be driven down firmly over the hand slat of the cover. In local or express shipments additional protection is needed. Some growers wire the lids, using sections of pliable stove wire. The use of hooks similar to those used for grape baskets, but larger in size is recommended for commercial growers. These hooks are inexpensive and can be applied quickly and securely.

The Ring Packer.—The ring packer is now being offered as a device to simplify the tailing of baskets. Steel forms are furnished in three sizes to accommodate large, medium, and small sized apples.

This plan reverses the common packing practice since the tail is arranged first in the grooved form. A steel shell supporting a paper filler is then placed

on the facing form. When filled, the shell is removed and a basket is substituted. The basket is inverted and the form held firmly to avoid disturbing the tail.

This method affords a very simple method of arranging the tails. When the complete operation is performed perfectly a well packed and attractive package is the result.

Especial care is required, however, in filling the baskets. If filled too high, it is impossible to attach the lids, and improperly filled baskets result in a slack pack.

Some of its advantages:

1. Ease of tailing.
2. Attractiveness of the tails.
3. Protection furnished by the paper liners.

Some of its disadvantages:

1. Initial cost of equipment.
2. Cost of paper liners.
3. Hard work involved in inverting the baskets.
4. Possibility of slack pack—especially with large sizes.

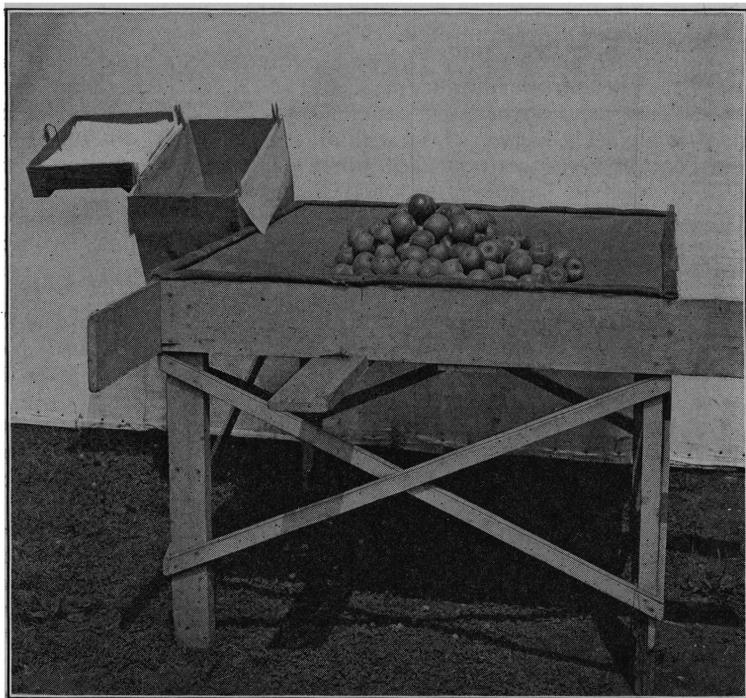


Fig. 14.—Packing arrangement for box apples. Square, canvas-top table with canvas nailed to edges and stripped with old rubber hose. The extensions at the left front show the arrangement for holding the boxes. The paper hod with needle for holding wraps is hooked over the side of the apple box. Note the clothes pins for holding the lining paper in place.

APPLE BOX PACKING

Like both the barrel and basket the box pack has certain advantages. It is more attractive than the barrel. Being a smaller pack, it is also preferred by some consumers. Retailers often maintain that they can handle boxes of apples to better advantage than they can apples in barrels. Some distributors also declare that apples in boxes show less injury from bruises than apples in barrels or baskets. This is questionable, however, as others are firm in the belief that it is just as easy to pack in barrels or baskets to prevent injury in transportation as it is in boxes. All agree, however, that if apples are packed in boxes the product should be of high quality and well grown.

CLASSIFICATION OF VARIETIES OF MISSOURI APPLES SUITABLE FOR PACKING IN BARRELS, BASKETS OR BOXES

<i>Barrels</i>	<i>Baskets</i>	<i>Boxes</i>
Ben Davis	Transparent	Grimes
Gano	Red June	Jonathan
Collins	Liveland	Kind David
York	Duchess (Oldenburg)	Delicious
Rome	Benoni	Golden Delicious
Minkler	Maiden Blush	Rome
Willow	Chenango	Stayman
Winesap	Wealthy	Winesap
Arkansas	Grimes	Arkansas
Arkansas Black	Jonathan	Arkansas Black
Ingram	King David	
Ralls (Geniton)	Delicious	
	Golden Delicious	
	Huntsman	
	Winesap	
	Arkansas	
	Arkansas Black	

Box Material—In order to make the box attractive, bright lumber free from knots should be secured. Pine and spruce have generally proven most satisfactory for this purpose. Box material is generally purchased in the knocked-down form and is made up by the grower when desired.

Lining Paper.—To protect the fruit and keep it clean the boxes are lined with white paper, two sheets being required for each box. Paper may be secured in two sizes. For the standard box it should be 17½x26 inch and for the special box, 19¾x26 inch.

The sheets of paper are placed on either side of the box just overlapping at the middle of the bottom. They extend up the side and are bent back over the outside of the box. When the box is filled with apples, the two loose ends of the paper, which hang over the side of the box, are brought together so that they overlap on top of the fruit. To prevent the paper from tearing when the boards are nailed over the top, a half or three quarter inch fold or crease is often made in each sheet at the bottom of the box. This fold should lie along the side of the box, otherwise it will not pull out when the bulge is put in the bottom of the box. Some packers secure the necessary fold in the paper to prevent tearing by pressing it into the cracks between the bottom and side boards. Lining paper for apple boxes is usually made with one side

glazed and the other side rough. Such paper should be placed in the box so that the rough side will be next to the apples.

Layer Paper.—As a rule layer paper is placed one sheet on top and one on the bottom inside the lining paper. The layer paper is also frequently used between the layers of apples to make the pack of the right height. One of the most common kinds of paper used is the colored manila tag board, the size being $17\frac{1}{2}\times 11$ inch or $19\frac{1}{2}\times 10\frac{1}{2}$ inch, depending on the size of the box.

Oiled Paper Wraps.—Where apples are to be stored until Christmas or longer, oiled paper wraps are strongly recommended. Investigations and observations at a number of agricultural experiment stations have shown that the oiled paper wraps are very valuable in preventing storage scald and other storage troubles. The cost of oil wraps is somewhat greater but the added protection to the fruit makes the additional cost a good investment. The wraps should contain 15 per cent oil by dry weight.

Shredded oiled paper is also used in barrel packs which are to be stored for any considerable length of time. The shredded paper is sprinkled over the apples as they are packed. Investigations have also shown that the shredded oiled paper prevents and delays the development of scald and other storage diseases. It is generally recommended by producers and buyers who have used it.

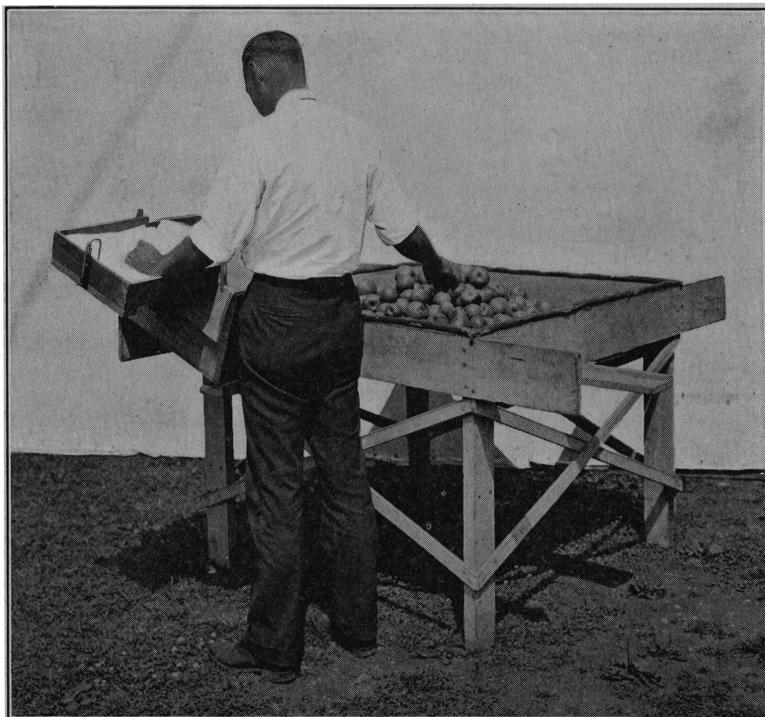


Fig. 15.—The paper is picked up with the left hand between the thumb and forefinger, and the apple with the right hand.

Wrapping Paper.—All boxed apples should be wrapped for best results. The wrapper protects the fruit from bruises, makes it easier to pack, keeps it clean, tends to prevent the spread of decay from one apple to another, and enhances the appearance of the package. Perhaps the greatest advantage of the wrapper is that it enables the packer to produce a firmer and tighter pack. The wrapping paper may be light manila, smooth or glazed on one side and rough on the other. The rough side of the paper is placed next to the fruit. This tends to take up the moisture on the fruit, while the glazed side is effective in preventing moisture and dust from reaching the apples. The size of the wrapper will vary according to the size of the fruit. For small apples 8x8 inch or 9x9 inch is satisfactory, while for larger apples 10x10 inch or 11x11 inch gives better results. For average sized apples a 9x9 inch paper wrap is generally best, that is, for sizes running 125 to 180 per box.

Box Packing Table.—A very satisfactory table for apple packing is shown in figure 14. A box packing table is generally more shallow and holds fewer apples than tables used for barrel packing. The table should be supplied with a rack or shelf at one end to hold the box in an inclined position while it is being filled. Devices are also needed for holding paper wrappers, lining paper, or layer paper. The table is usually about 3 ft. high, four feet long, three feet wide, and should be well braced for orchard packing work. The top is covered with canvas or strong burlap. A cover with a double layer of canvas, the upper piece being fastened only at one side, will enable the packer to shake off dirt and leaves as they accumulate upon the canvas.

Wrapping the Apple.—To wrap and box pack the apple properly requires considerable skill. The individual will generally make better progress and learn more rapidly if given instruction through lectures and demonstrations. It is hoped, however, that the description and discussion which follows will be of assistance. There are many methods of wrapping the fruit, and rarely will one find two packers using the same method.

The paper is picked up with the thumb and first finger of the left hand in such a manner that when the palm of the hand is turned upward, one corner of the paper will point toward the operator. A rubber thumb stall may be worn on the left hand to aid the packer in picking up the wrapping paper. The apple is thrown into the center of the paper with sufficient force to nest it well in the wrap but not with force enough to tear the paper. When the fruit is to be packed on its side, the apple should be thrown on its side in the palm of the hand with the end, usually the blossom end, pointing toward the operator, while if it is to be packed on end, it should rest with the blossom end down. The right hand with the thumb spread is now brought down the wrist of the left hand, the thumb folding in one corner of the paper and the fingers the opposite corner. The corner of the paper pointing toward the operator is next folded over the apple by sliding the right hand over the apple. The apple is now grasped by the fingers of the right hand and the corner of the paper opposite the packer folded over the apple by sliding the fingers of the left hand over that end of the apple. The grasp of the apple is transferred back to the left hand and the hand turned to bring the palm and apple downward. The apple is now ready to place in the box.

The apple is placed in the box in its proper position and the fingers gently withdrawn from beneath it. Placing in the box in this way brings the folds of the wrap beneath the apple, which acts as a cushion for it. Care should be taken in wrapping the apple to permit only the finger tips to come beneath

the apple when it is turned over preparatory to placing in the box; otherwise, considerable difficulty will be experienced in withdrawing the fingers without disturbing the wrap. As the apple is being placed in the box with the left hand the packer reaches with the right hand for another apple.

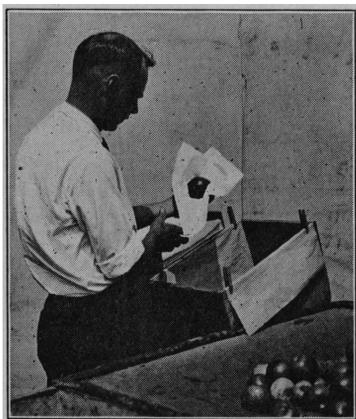


Fig. 16.—Apple is nested in wrap, and right hand brought in position to start folding down three corners of the wrap nearest packer.

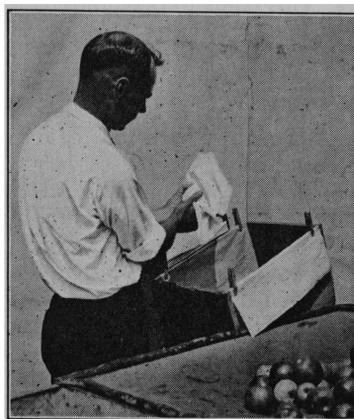


Fig. 17.—The right hand in position with the upper corner of the wrap folded into place by the thumb.

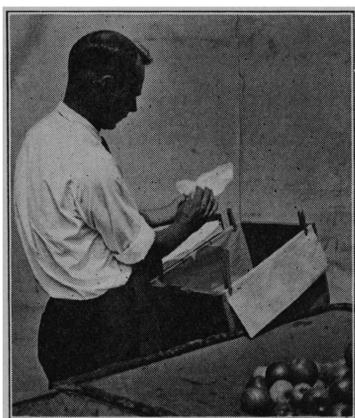


Fig. 18.—The lower corner of the wrap folded into place with the fingers of the right hand.

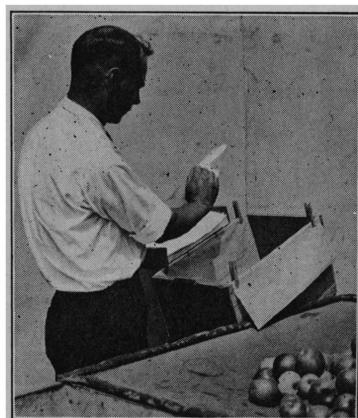


Fig. 19.—Position of right hand in folding down the corner of the wrap nearest the packer and at time apple is transferred to left hand.

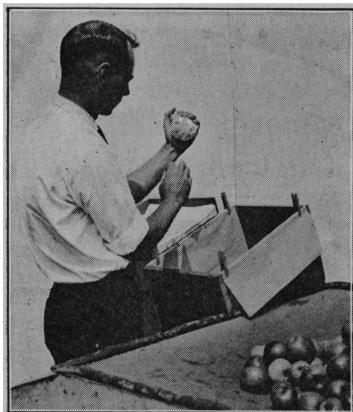


Fig. 20.—The wrapping completed. The apple as held by the left hand after the fingers have folded in the corner of the wrap opposite the packer

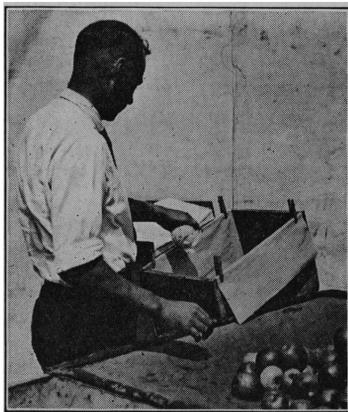


Fig. 21.—Placing the apple in the box. The hand has been turned to bring the folds of the paper beneath. The apple is held so that only the finger tips are on the under side.

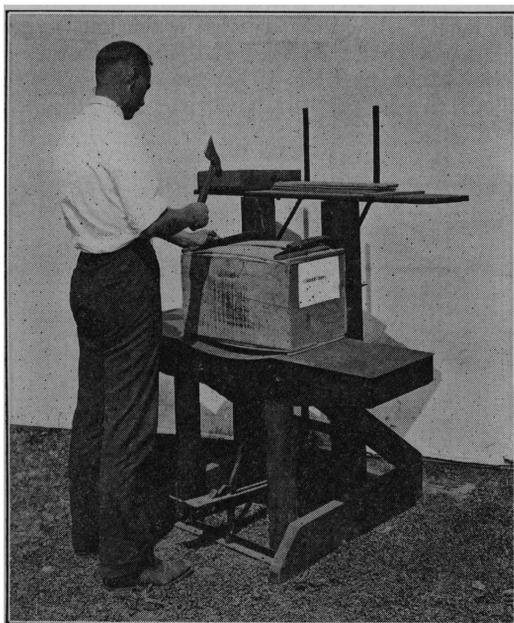


Fig. 22.—Nailing on the lid. The press holds the lids in position and is a necessary piece of equipment when very many boxes apples are to be packed. The lids, cleats and nail box are kept on the shelf within easy reach of the operator. Note the even bulge at the top and bottom of the box.

Size and Use of Wrapping Paper

For apples running 188 or less to the box use 8 x8 in. paper.
 " " " 175 to 125 " " " " 9 x9 " "
 " " " 112 to 80 " " " " 10x10 " "
 " " " 72 or larger" " " " 12x12 " "

Layer paper, 11x17½ inches for the standard box, runs 14 to 15 sheets per pound.

Lining paper, 17½x26 inches for the standard box, runs 30 sheets to the pound.

Card board for packing 100 boxes of apples will weigh about 15 or 16 pounds.

Lining paper for packing 100 boxes of apples will weigh approximately 7½ pounds.

Wraps for packing 100 boxes of apples weighs about 50 pounds.

Wrapping paper, 9x9 inches, will average from 315 to 330 sheets to the pound. Since the quality of the paper varies greatly the weight frequently varies markedly.

Box Packs.—Apples are generally sized carefully by hand or by mechanical machinery before being placed upon the packing table. The packer adapts the pack to the size of the apple and the box. There are two principal sizes of boxes now in use—the inside dimensions of the standard box are 10½ inches deep by 11½ inches wide by 18 inches long, while the dimensions of the other box are 10x11x20 inches. The first box is preferable and is generally made use of in this State, but the capacity is a trifle less than the other one.

There are many different kinds of box packs used, but they all may be classified under two heads; the "straight" and the "diagonal." There is,

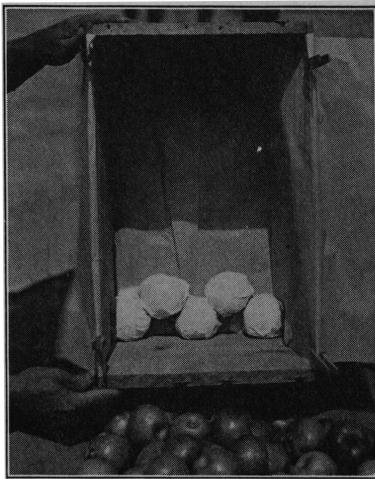


Fig. 23.—Starting the 3-2 pack. Similar arrangement is continued until the tier is completed. The apples of the second tier fit over the spaces of the lower.

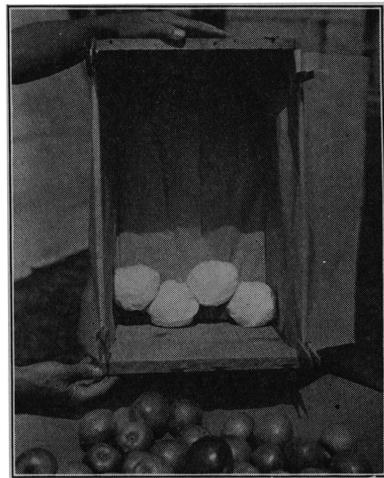


Fig. 24.—Starting the 2-2 pack. The apples in the next tier fit over the spaces in the tier below.

however, still a third type of pack known as the "offset" pack. This pack differs from the diagonal slightly, and since it is rarely used it will not be described in this discussion.

The straight pack is not generally used because it produces a great amount of bruising. This is due to the fact that the spaces left between the fruit are too large. Most of the diagonal packs are usually "3-2" or "2-2". Apples of nearly all sizes may be packed in the 10½-inch × 11½-inch × 18-inch box using the diagonal pack. It is the most attractive and satisfactory box pack.

Description of the 3-2 Pack.—The 3-2 pack is suitable for all apples larger than five across the end of the box. This pack should always be five layers deep. Figures 23 and 25 show the method of starting the 3-2 pack. The first apple is placed in the lower right hand corner, the second in the lower left hand corner, and the third in the center. The next two apples are placed in the two spaces—one on either side of the middle apple—and the work is continued as shown in figure 25.

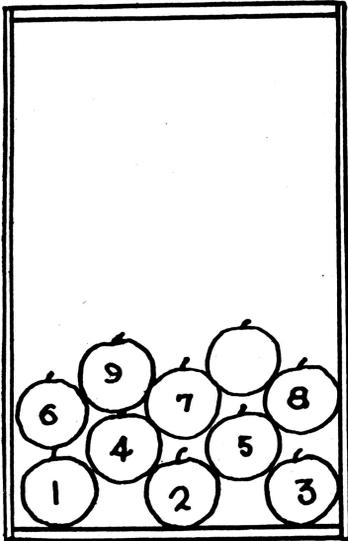


Fig. 25.—How to commence bottom layer of 3-2 pack. Continue in this way till layer is finished.

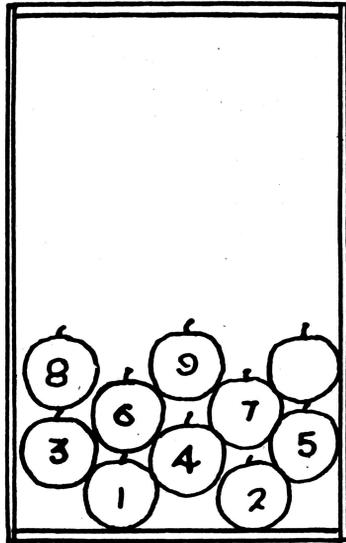


Fig. 26.—How to commence the second layer of the 3-2 pack. Fruit is placed in spaces of layer below.

The second layer is started by putting the apples over the spaces of the apples of the first layer. To do this the second layer is started with two apples instead of three as in starting the first layer, figure 26. By this method of packing, each apple of the second layer is placed over a space of the layer below instead of resting directly upon an apple of that layer, as with the straight pack. Since there is considerable elasticity in this pack, the surfaces of the apples are less likely to be bruised.

Description of the 2-2 Pack.—The 2-2 pack may be used for all apples larger than four across the end of the box. This pack should always be four

layers deep. Figures 24 and 27 show the first layer and method of starting the pack. An apple is placed in the lower right hand corner, while the second one is placed in the middle of the spaces remaining. The next two apples are placed in the spaces left by the first two. The work is then continued as indicated in figures 27 and 28 until four layers are completed and the box properly filled.

Controlling Height of Pack.—The bulge or swell in the apple box near the center is very important. When the box is ready for the lid, the apples at the ends of the box should show about one inch, and the center apples about two inches above the top of the box. When the lids are nailed on, the bulge for both top and bottom, should be from $\frac{3}{4}$ to 1 inch high. Where this is not true the pack may become loose when shrinkage occurs.

Packers now regulate the height of the pack by the tightness of the layers. The tighter the apples are packed in each layer, the higher the pack. This is true because the closer the apples are drawn together, the less the space for the apple above.

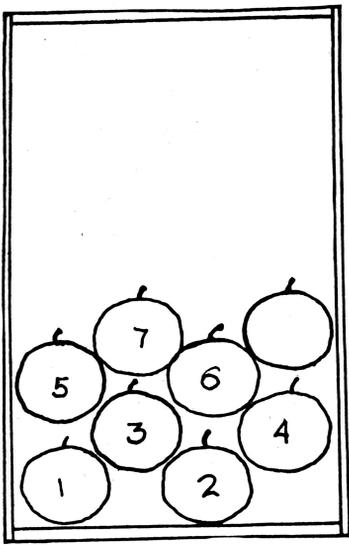


Fig. 27.—How to commence the 2-2 pack. Continue in this way till layer is finished.

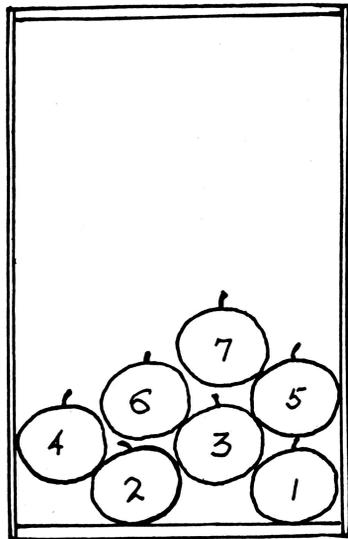


Fig. 28.—How to commence second layer 2-2 pack. Fruit is placed in the spaces of layer below.

The largest apples should be packed loose in the 2-3, 3-2 and 3-3 packs. If this is not done the pack is likely to come too high above the box. For best results, large apples in each layer of these packs should just touch.

The smallest apples in the 2-2, 3-2 and 3-3 packs should be packed tight in each layer. This is necessary in order to secure sufficient height.

For apples intermediate between large and small in size, pack proportionately between loose and tight.

The Box Press.—After the apples are packed in the boxes, they are taken to the press and the tops are nailed down. The box press facilitates the nailing of the top and is very desirable where much packing is done. The best nails for this purpose are $1\frac{3}{4}$ inch cement coated box nails. Four nails are

used at each end and they are driven through the cleats. For the entire box about 32 nails are needed. There are many different types of presses most of which may be made easily at home. The main points to keep in mind are as follows: (1) The clamp should rest on the end of the boxes in order that the top may be nailed down without interfering with the bulge. (2) The operator should endeavor to fasten the top firmly without bruising the fruit badly. See figure 22.

Labeling.—When an attractive label is pasted on the end of the box it may become a valuable means of advertising the product. This is especially true if the producer strives to maintain a high standard. It is generally advisable to give the name of the grower, the variety of fruit, and the number of apples in the box. The net weight should be stamped on each box.

The following table gives the number of apples of different sizes per standard box.

APPLE PACKS

Style of Pack	No. of Apples in Row	No. of Apples in Box	No. of Layers Deep
3x2 diagonal	9x9 long	225	5
3x2 "	8x9 "	213	5
3x2 "	8x8 "	200	5
3x2 "	7x8 "	188	5
3x2 "	7x7 "	175	5
3x2 "	6x7 "	163	5
3x2 "	6x6 "	150	5
3x2 "	5x6 "	138	5
3x2 "	5x5 "	125	5
3x2 "	4x5 "	113	5
2x2 "	7x8 "	120	4
2x2 "	7x7 "	112	4
2x2 "	6x7 "	104	4
2x2 "	6x6 "	96	4
2x2 "	5x6 "	88	4
2x2 "	5x5 "	80	4
2x2 "	4x5 "	72	4
2x2 "	4x4 "	64	4
2x2 "	3x4 "	56	4
2x2 "	3x3 "	48	4
5 straight	9 "	225	5
5 "	8 "	200	5
2x1 diagonal	5x6 "	50	3
2x1 "	5x5 "	45	3
2x1 "	4x5 "	41	3
2x1 "	4x4 "	36	3

LOADING AND HAULING RECORDS

Every grower should maintain an accurate record of his shipments, both as a record for reference and as a basis for substantiating claims for damage. For the latter purpose, the records must be indisputable and a jotted memorandum in a notebook will not meet this requirement.

Figure 29 is a reproduction of a car loading record that has been found very satisfactory. This meets all requirements of accuracy as a reference record, and furthermore, reduces chances for error to a minimum, since there is a double check on all items. Such a record, backed with the numbered hauling tickets, will greatly assist a grower in presenting a claim.

This record carries all the essential details required for a record, not only as regards the actual loading but as a history of the time and date the car is

CAR LOADING RECORD

Car Initials and Number **MMT 24350**

Car set for loading **9:30 A.M. Sept. 18, 1924** Turnar Station

How much ice in car **Full** Date car set for loading **Sept. 18, 1924**

Started loading **11 A.M. Sept. 18, 1924** Finished loading **3:30 P.M. Sept. 20, 1924**

Car billed out **5:30 P.M. Sept. 20, 1924** Refrigerator or box car **Ref.**

DATE	Number of Bbls.	Weight of Bulk Apples	Name of Orchard	Hauled by	Variety	Grade	Received by	Ticket No.
9-18	14		Turnar	Jones	Jonathan	Fan	Brown	3293
"	"		"	"	"	"	"	3294
"	"		"	"	"	"	"	3295
"	"		"	"	"	"	"	3296
"	"		"	"	"	"	"	3297
"	"		"	"	"	"	"	3298
"	"		"	"	"	"	"	3299
9-19			"	"	"	"	"	3300
"	"		"	"	"	"	"	3301
"	"		"	"	"	"	"	3302
"	"		"	"	"	"	"	3303
9-20	"		"	"	"	y	"	3304
	108							

Keep duplicate and mail to office with weekly report. After car is loaded, attach Original to Bill of Lading and mail to Kansas City office. Tack original and duplicate in car to use while loading car.

Seal Numbers **L 3246197&8**

Fig. 29.—A car loading record which has been used successfully in Missouri orchards.

set, time loading is started and completed, car number and initials and the type of car used. The loading manifest shows the date of hauling, number of packages or pounds of fruit per load, variety, grade, hauler, receiver, orchard from which fruit is packed and the number of the hauling ticket. In using this record, the use of the hauling tickets plays an important part. It furnishes not only an accurate check on the car's contents, but it prevents any act of dishonesty on the part of the handlers.

The hauler is given a numbered ticket as shown in figure 30. This gives the date, variety, number of packages, and the hauler. The original is kept by the orchard foreman and the duplicate is given to the car loader by the hauler. He checks the load and enters its contents on the car loading record. He can check any error at once and have the records maintained accurately.

HAULING TICKET		No 3293
Received from Turner		Orchard
..... 14	Bbls. Apples	
.....	Boxes Apples	
.....	Loads Bulk Apples	
Received at car by	Hauled by	
..... Brown Jonas	
	Date..... Sept. 18, 24	

Fig. 30.—A sample hauling ticket which may be useful and very valuable

When the car is loaded, the car loading record and the duplicate hauling tickets are given to the orchard foreman, who checks the record for accuracy. The details required in maintaining such a record are slight in comparison to the actual value of accurate information on all shipments.

SHIPPERS' HINTS

There are many details connected with the shipping of fruit in car lots that may not be clearly understood. To beginners, the methods may be entirely new. A few of the more important factors may, therefore, be worth reviewing or explaining.

Ordering Cars.—A grower must cooperate with the railway authorities if he expects to secure satisfactory and prompt service. The railroads need the freight for their maintenance, but they cannot furnish cars for loading unless the rolling stock is available for distribution. It is the duty of the shipper to notify in advance the freight agent as to his probable needs. A good plan

is to notify in writing a month in advance of the shipping season, giving the following details:

1. Switch where loading is to be done.
2. Probable date of first shipment.
3. Probable number of cars needed each week.
4. Probable total number of cars required.
5. Type of cars needed.
6. If refrigerator cars, whether dry or iced.

With this information at hand, the railroads are able to take care of a shipper's needs. A reserve supply can be maintained and when the shipping season begins a grower's request for cars can be filled without delay.

Cars not set iced are allowed 48 hours for loading. The time is usually figured from the first 7:00 a. m. following the date car is set. Iced refrigerators are usually allowed only 24 hours for loading. If the shipper does not load within the prescribed time, he is liable to a demurrage charge. The charge for iced cars is quite high, but a grower cannot risk damage to his fruit during hot weather and the charges are offset by the value of the refrigeration.

Billing Cars.—Shipments of two types are in general use:—(1) straight and (2) shipper's orders. The straight bill of lading is a simple authorization to the carrier to deliver the car and contents to the consignee at the stated designation. This type is used between parties where previous experience has developed trust. It is not to be recommended in any cases where uncertainty exists, for the grower has no recourse upon the railroad in case fruit is not paid for. However, straight bills or "open" shipments are satisfactory when

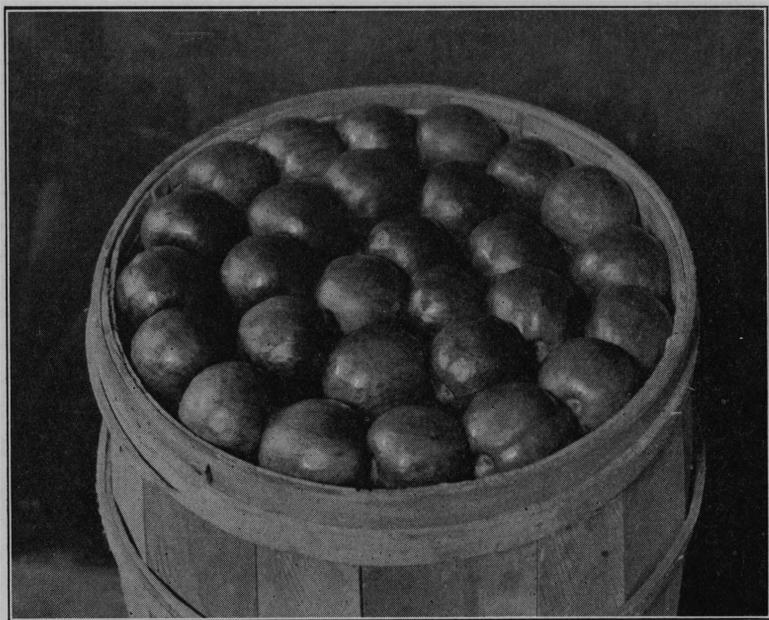


Fig. 31.—A well "ring-tailed" barrel of apples showing good size and proper uniformity.

dealing with reputable organizations and they are generally recommended for all shipments of perishables.

The "shipper's order" bill of lading must carry an order issued by the shipper through a bank in the consignee's city, before the shipment can be delivered. It is a negotiable instrument and is in quite general use among growers. The bill must state fully the contents of the shipment, the commodity shipped and the total weight. The shipment may or may not permit inspection at destination. The bill of lading and a draft drawn upon consignee both are mailed to a bank in the consignee's city. He is notified by the bank upon receipt of the bill of lading, and, upon payment of the draft, receives the bill of lading and effects delivery of the shipment. This is a safer measure in making shipments where any doubt exists.

In billing cars, whether straight or open, there are certain protective features that should be clearly understood. These are effective only when included on the bill of lading and the shipper must designate the type of service he desires.

(1) "*Standard Refrigeration.*" Under this service the railroad agrees to ice the cars whenever necessary and to deliver the shipment under sufficient ice to maintain refrigeration protection.

(2) "*Standard Ventilation.*" This authorizes the railroads to use their judgment in the ventilation of cars. It is more comprehensive than "Vents open" or "Vents closed." The climatic conditions at destination may be different from those at the point of origin and a car billed "Vents open" might be subjected to extremely low temperatures. Where billed under standard ventilation, the vents will be adjusted to meet prevailing climatic conditions.

(3) "*Storage in Transit.*" Fruit that is being shipped to storage should always be billed under the "storage in transit" privilege. When sold, it can be shipped to final destination under the through rate charge. If this is not noted on the bill of lading, however, the shipper must pay the extra cost of the two hauls.

(4) "*Shipping Options.*" These are designated as Option One and Option Two. The railroads have set October 15th as the date ending safety for shipments originating from areas subject to low temperatures. The shipper of perishable products must state on his bill of lading which service he desires.

Option One is the shipper's protective service. The railroad contracts to protect such shipments from injury and an extra charge is made for the service.

Option Two is the carrier's protective service. The shipper assumes full responsibility under this option and has no recourse in case of damage in transit from low temperatures.

Diversion.—If for any reason a shipper desires to change the destination of a rolling car, he may do so by filing with the local agent or other authorized agent of either the receiving or delivering line an order for diversion. This order must cover car number and initials, contents, consignee, destination, shipping point, date of billing, name of shipper and also the name of new consignee and new destination. By adding "Protecting through rate" the shipper protects himself against a combination of local rates.

Notification of Shipments.—Fruit sales are often made to cover shipments in transit and most fruit buyers demand wire service on shipments being

sent to their order. The grower should include all information needed for each car, including:

1. Date of shipment
2. Loading point
3. Car number and initials
4. Contents
5. Grade
6. Destination

The following specimen wire may serve as a guide:

COLUMBIA, MO., SEPT. 15, 1926.

J. C. FURNAS & COMPANY
MINNEAPOLIS, MINNESOTA

ROLLING TODAY COLUMBIA WABASH 16432 CONTENTS
SIXTY THREE BARRELS NUMBER ONE JONATHANS NINETY
SEVEN BARRELS NUMBER ONE GANO STOP N Y D X 13732
CONTENTS FIVE HUNDRED FOUR BASKETS FANCY JONA-
THANS

FRANK D. LOOMIS

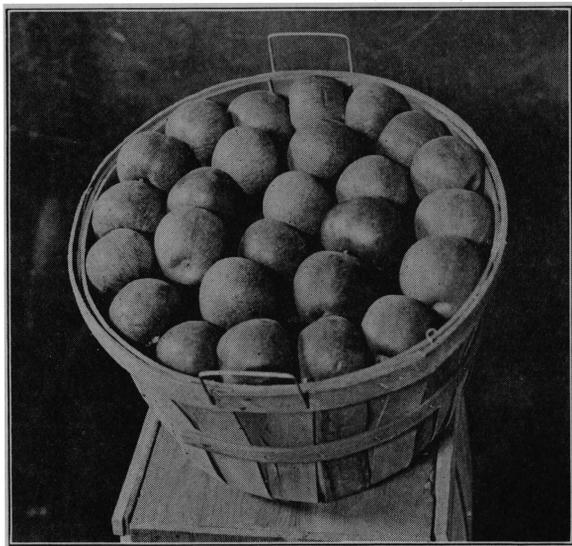


Fig. 32. —A ring-faced or tailed basket. Tailing is an essential part of basket packing.

LOADING CARS

Loading Barrels.—There are many ways in which barrels may be loaded in cars, but there are only two ways that can be recommended. In both of these the barrels are loaded on the sides or bilge.

In the one most commonly used in this section, the barrels are placed in rows of three barrels each. In the first tier the barrels are placed against one side of a car, leaving a space of about half a barrel length open at the other side of the car. The second row is started against the other side of the car and the open spaces are thus alternated with each row. The barrels in the second row are blocked with short lengths of 2"x4" or small rocks to prevent slipping. The second tier is started so that the open ends alternate with those of the first layer. The third tier is made so as to correspond with the first layer.

The other method is probably as good and somewhat simpler to arrange. In this plan, the ends of the first tier are all placed against one side of the car. The ends of the second tier are placed against the other side of the car. The third tier is placed in the same manner as the first.

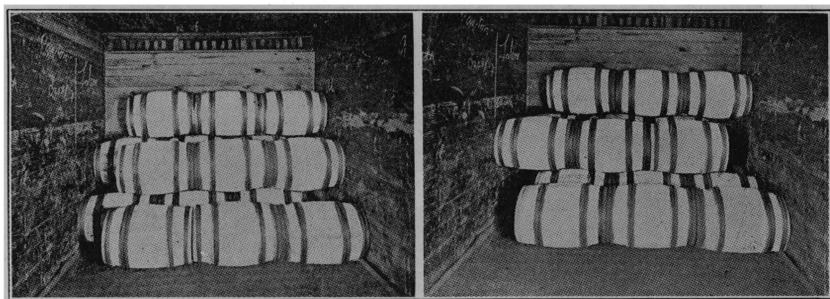


Fig. 33.—An illustration of two of the best methods of loading barrels in cars.

In either method there is an even distribution of the weight and the pressure is greatest where the barrels are best able to withstand it. When loaded in either manner there is good ventilation throughout the cars.

The minimum weight required for barreled apples is 24,000 pounds. Figured at 150 pounds per barrel, it would require 160 barrels to meet this weight. However, an average 32-foot refrigerator car holds 168 barrels when loaded three high. A full tier is advisable, as it prevents the injury that may result when the barrels are not securely braced. Figure 33 shows loading method for barrels.

Loading Baskets.—Much damage to fruit in shipment has resulted from careless loading of the baskets in the cars. It is very important that the packages be packed tightly and that there be no chance for the packages to move. Where they are packed loosely in the car, they become disarranged by the incessant jostling and jarring in transit; the covers are torn off and the contents spilled.

Loading four high will give the minimum weight in refrigerator cars of standard size. Figure 34 shows methods recommended for use in loading bas-

kets. When loaded properly the baskets should arrive at their destination in the condition shown in figure 35.

The end to end offset method of loading has the following advantages:

1. Increases the number of baskets.
2. Cars arrive in better condition.
3. It is easier to keep a tight load.
4. A gate is not required to take up slack.

By following the directions indicated on the loading charts, the most effective loading methods may be readily applied.

Loading Boxes.—Packed apple boxes are placed on their sides, with a space of about one inch between them. The boxes are laid lengthwise across the end of the car, which gives 18 lengthwise and 7 across. They are loaded five high, which amounts to a total of 630 to the car. A slat 1 inch wide and $\frac{1}{4}$ inch thick is placed crosswise of the car and nailed on the sides of the boxes. The

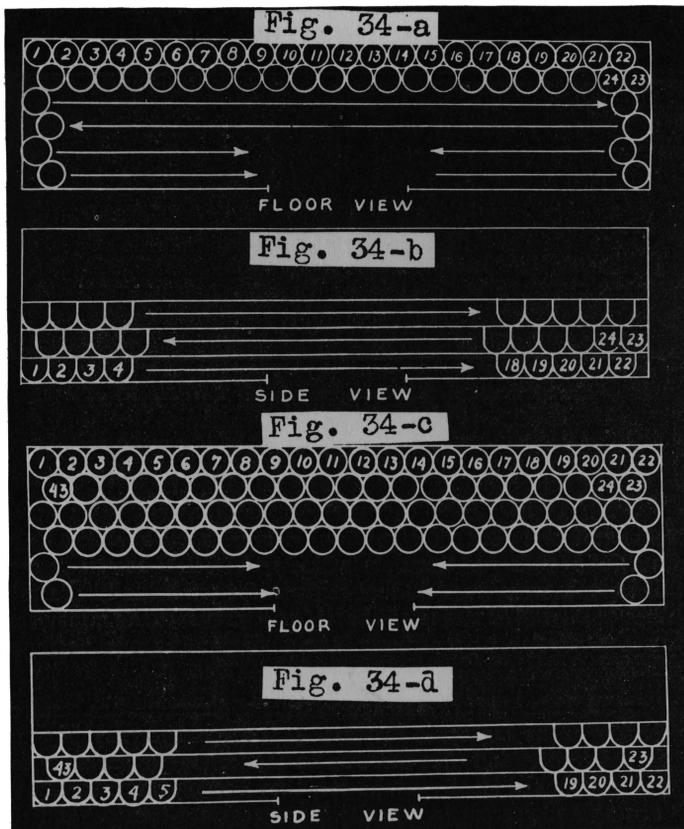


Fig. 34.—Diagrams showing how packed apple baskets may be loaded tightly in the car to prevent movement in transit. End to end methods, figs. a, b, c, and d. Courtesy of Package Sales Corporation, South Bend, Indiana.

second layer of boxes is then placed over the first, and another strip is used; and the work is continued until the loading is finished. Both ends of the car are filled and a space is left in the doorway, which is used for bracing the boxes to prevent sliding and injury to the fruit.

SHIPPING POINT INSPECTION

The inspection of fruit at shipping point is one of the most valuable services to the fruit grower. Under the supervision of both the Federal and State authorities, grades, standards and packs are more rigidly maintained. The certificate of inspection received by the producer enables him to deal in a more business-like way with buyers. The buyers also know that they cannot reject or refuse Federal or State inspected fruit without proper procedure and check-up. The inspection certificate is *prima facie* evidence that fruit of a certain grade left the shipping point in condition suitable for its arrival at destination in marketable condition. It adds force, life and confidence to contracts regarding grade, marketable condition and carrier's responsibility. The certificate is without question invaluable in the proper adjustment of claims and controversies between shipper, buyer and carrier.

APPLE PACKAGES

Cost. The package costs vary within certain limits with the seasons. The prices asked for the season of 1925 were generally the same as those that had ruled for the past three years.

Standard, mill-run apple barrels, with number one heading and hoops were offered at prices ranging from 58c to 65c f.o.b.

Western pine box materials were offered at prices of 19c to 21c f.o.b.

Carloads of standard bushel apple baskets could be secured at \$1.60 to \$1.70 per dozen baskets, delivered at all Missouri points.

Carlots.—In carlots, empty apple barrels average 600 per car; knock down box material, 6000 per car, and nested apple baskets 500 dozen per car.

Many growers pool their orders to take advantage of carlot prices and carlot freight rates.

Loading Capacity.—The loading counts for standard refrigerator cars are as follows:

Boxes.—Loading with boxes ($10\frac{1}{2} \times 11\frac{1}{2} \times 18$) piled 7 across the car, 18 lengthwise and 5 high, allows 630 to the car.

Baskets.—Loading 6 across the car, 21 lengthwise and 4 high, allows 504 to the car.

Barrels.—Loading three tiers high, the bottom and top tiers will each contain 57 barrels and the middle tier 54 barrels, making a load of 168 barrels.

BRACING LOADED CARS

No packed fruit should ever leave the loading point without being firmly braced. The constant swaying and jarring of the cars in motion will loosen the packages and when the cars are switched, the packages become disarranged and their contents spilled. Cars are frequently rejected on this account and it should be a rule to avoid this possibility.

Barrels.—Barrels that are loaded properly give the least trouble, and require no bracing. When cars are filled with standard loads there should be three tiers, the top and bottom tiers containing 57 barrels each and the middle

tier containing 54 barrels. Loaded on the bilge or side, the form of the barrel aids in preventing movement of the packages. When loaded either short or long the top tier will not be filled and this tier should be braced by nailing 2×4 's across the car to prevent the barrels from rolling.

Baskets.—Baskets are more difficult to load securely than any standard package. They lack the rigidity of either the box or barrel and the elasticity of the package permits some movement, even when the cars are loaded properly.

In standard cars there should be six rows with 21 baskets in each row. Loaded four high this gives a count of 504 baskets per car, or 126 baskets in each tier. If the loading has been carefully done, the baskets fit quite tightly. When loaded improperly or when the top tier is incomplete, bracing with 2×4 's should be practiced.

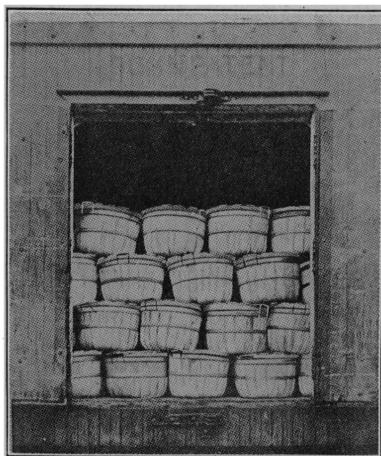


Fig. 35.—A well loaded car should arrive in this condition. Courtesy of Package Sales Corporation, South Bend, Ind.

Boxes.—Boxes are held in place by stripping with one inch-strips nailed across the full width of the car. The strips are nailed through the cleats of the boxes using a strip at both the front and back of the boxes. These strips separate the tiers allowing the cool air to circulate more readily and facilitate cooling the contents. The loads are braced at the doorways by constructing gates with 1×4 ' material. One upright brace is allowed for each row of boxes and these are nailed to top and bottom pieces cut to fit the width of the car. These are cleated at the sides and bottom of the car and are further braced by running 2×4 's diagonally from the top of one gate to the bottom of the other. Four of these diagonal braces are sufficient for each car.

Bulk.—Apples loaded in bulk must have the bulkheads braced securely. If straight gates are used the diagonal braces described for boxes should be used.

When V-type heads are used the bulkheads should be brought together at the center of the car. The two center uprights may be wired or spiked to-

gether. The cleats on the ends of the grain doors should be nailed to the sides of the car and short pieces of 2×4 's should be nailed to the floor against the bottom of the bulkheads.

**PRACTICAL INFORMATION ON PICKING, PACKING,
AND SHIPPING APPLES**
In This Circular as Follows:

	Page		Page
Picking	2	Racking the Barrel	18
When to Pick	2	Tailing the Barrel	18
Holding Apples in Storage.....	2	Heading the Barrel	19
How to Pick	3	Stenciling the Barrel	20
Picking Equipment	3	Use of Corrugated Caps	20
Ladders	3	Standard Apple Barrel	20
Lug Boxes	3	Apple Basket Packing	20
Handling the Picking Crew....	3	Types of Basket Packing	21
Grading and Sizing Equipment	4	Racking the Basket	22
Sizing Board and Rings	4	Tailing the Basket	22
Apple Bulk Shipments	5	Basket Pads	23
Sorting Table and Its Location	6	Fastening Basket Lids	23
Table Equipment and Handling Methods	6	The Ring Packer	23
Grading Machinery	7	Apple Box Packing	25
Sorters and Their Work	7	Varieties Suitable for the Different Packs	25
Resetting the Sorting Table....	7	Box Material	25
How to Make a Chute Table....	7	Lining Paper	25
Bulk Apples by a Successful Missouri Grower	7	Layer Paper	26
Apple Barrel Packing	9	Oiled Paper Wraps	26
Packing Tables	9	Wrapping Paper	27
Operation of Chute Table.....	10	Box Packing Table	27
The Double-Chute Table	11	Wrapping the Apple	27
Moving the Table	12	Size and Use of Wrapping Paper	30
Advantages in Operating the Chute Table in Orchard..	12	Box Packs	30
Flat-Top Canvas Table	13	Description of the 3-2 Pack	31
Best Size of Canvas Flat-top Table	13	Description of the 2-2 Pack	31
Baskets Used for Grading	13	Controlling Height of Pack....	32
Harvesting and Packing Methods	14	The Box Press	32
Grading Apples in Orchard..	14	Labeling	33
(a) Advantages	14	Apple Packs	33
(b) Disadvantages	14	Loading and Hauling Records	33
Central Location	14	Shipper's Hints	35
(a) Advantages	14	Ordering Cars	35
(b) Disadvantages	14	Billing Cars	36
Packing Shed	14	Standard Refrigeration	37
(a) Advantages	14	Standard Ventilation	37
(b) Disadvantages	15	Storage in Transit	37
Grades and Standards for Apples	15	Shipping Options	37
Importance of Uniformity....	15	Diversion	37
Standardized Packing	15	Notification of Shipments	37
Growers Accept Uniform Pack	16	Loading Cars	39
Ultimate Returns Important..	16	Barrels	39
Appeal of Attractive Packages	16	Baskets	39
Barrel Packing Practices	16	Boxes	40
Preparing the Barrel for Packing	16	Shipping Point Inspection	41
Barrel Facing	17	Apple Packages	41
Color of Facing Apples	17	Cost	41
Value of Good Sorting	18	Carlots	41
Canvas Aprons for Tables....	18	Loading Capacity	41
		Bracing Loaded Cars	41
		Barrels	41
		Baskets	42
		Boxes	42
		Bulk	42

291892

UNIVERSITY OF MISSOURI - COLUMBIA
ELL 291892

S81 .E4 no.66-168



010-011318521



S
81
.E4
66-168
291892

