

DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

BULLETINS 1 - 20

1905-1907

DAIRY AND COLD STORAGE
COMMISSIONER'S SERIES

Article 18. Each and every member shall have the right to give away such fruit of his own raising as he or she may elect ; but shall not seek, solicit or make sale of fruit outside of the company, excepting windfalls and cull grades of any fruit that may not be accepted by the company. Any member so doing shall pay into the company's treasury the sum of fifty cents per bushel for all such fruits sold, excepting sales of aforesaid grades.

Article 19. All fruit delivered each day shall be credited to the person furnishing the same at the average price which the fruit brought that day.

One-third of the amount so credited may be retained by the company until the close of the season for final settlement, and from the aggregate of the amount so retained from each person there shall be, at the end of the season, before paying the same over to the respective members of the company, deducted all expenses and losses. All expenses of handling, packing and marketing fruit shall be borne by the several members of the company, in proportion to the number of bushels of fruit with which each has been credited. All losses and rebates shall be deducted in proportion to the money credit of each member.

Article 20. Whenever, in the opinion of the Directors it is impossible for the company to receive at its fruit house all the peaches grown by its members, they may permit individual members to grade and pack the same for shipment through the house, such period to be limited by the directors. Reasonable compensation will be allowed for such grading and packing.

Article 21. Permanent or temporary additions, extensions or any new buildings from time to time that may be constructed by the company including the present ice house, the cost of same shall be paid by the stock of issue by a fund sufficient to meet such costs by an assessment upon the said stock as it shall appear against each and every member, and not as an item of general expense.

Article 22. The cost of ice and cost of putting same into ice house as it now stands, and each and every season when the said ice house shall be filled, shall go into the general expense and be paid for as named in Article 19 to the By-laws.

Article 23. Before the annual meeting, as named in Section 3 of the Constitution, if there shall be available funds in the treasury after all debts shall have been paid, the Board of Directors then, if in their opinion it shall be deemed best, can order a cash dividend to be declared and paid to each stockholder of record up to the first day of December of each year.

DEPARTMENT OF AGRICULTURE
BRANCH OF THE DAIRY AND COLD STORAGE COMMISSIONER
OTTAWA, CANADA

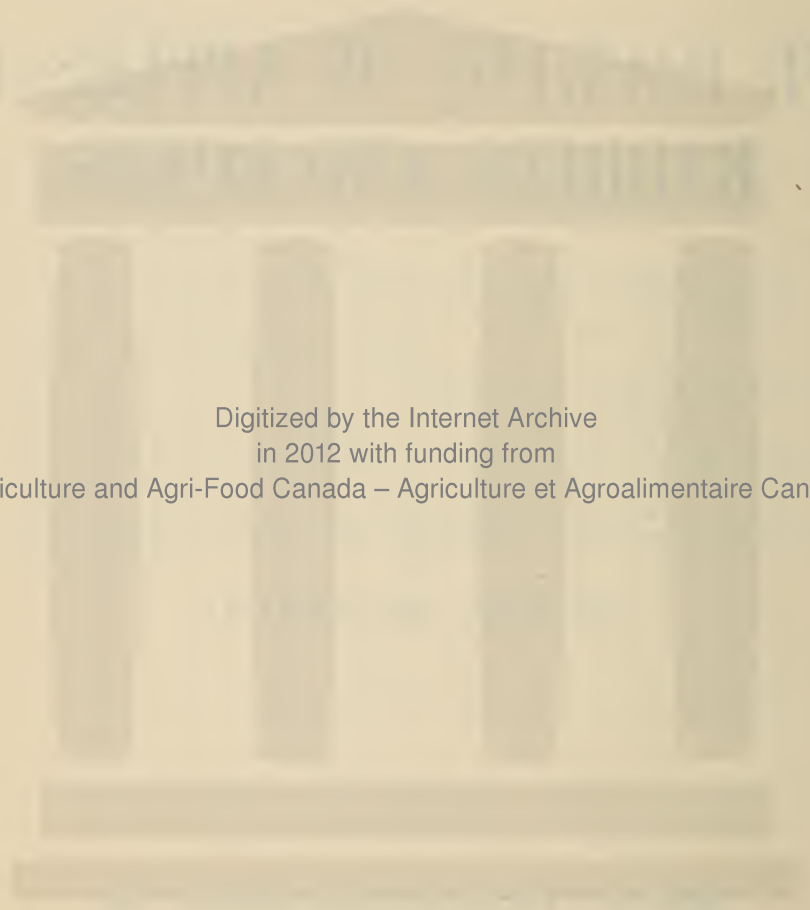
THE PACKING OF APPLES IN BARRELS AND BOXES

BY
ALEX. McNEILL

Bulletin No. 19, Dairy and Cold Storage Commissioner's Series

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.

JUNE, 1907



Digitized by the Internet Archive
in 2012 with funding from
Agriculture and Agri-Food Canada – Agriculture et Agroalimentaire Canada

LETTER OF TRANSMITTAL.

OTTAWA, June 6, 1907.

To the Honourable SYDNEY A. FISHER,
Minister of Agriculture.

SIR,—I beg to submit for your approval bulletin No. 19, Dairy and Cold Storage Commissioner's Series, entitled 'The Packing of Apples in Barrels and Boxes,' which has been prepared by Mr. Alex. McNeill, Chief of the Fruit Division of this branch of your Department.

It is not desirable that all apples should be packed in boxes, as is clearly shown in the bulletin, but it is important that box packing, as far as it goes, should be properly done. There is much more to be learnt about the methods and the art of packing a box of fruit than most people imagine before they have tried it. It is hoped that this bulletin will meet to some extent at least the need as well as the demand for information along this line, and that it will be helpful to many who are endeavouring to reach good results in this direction.

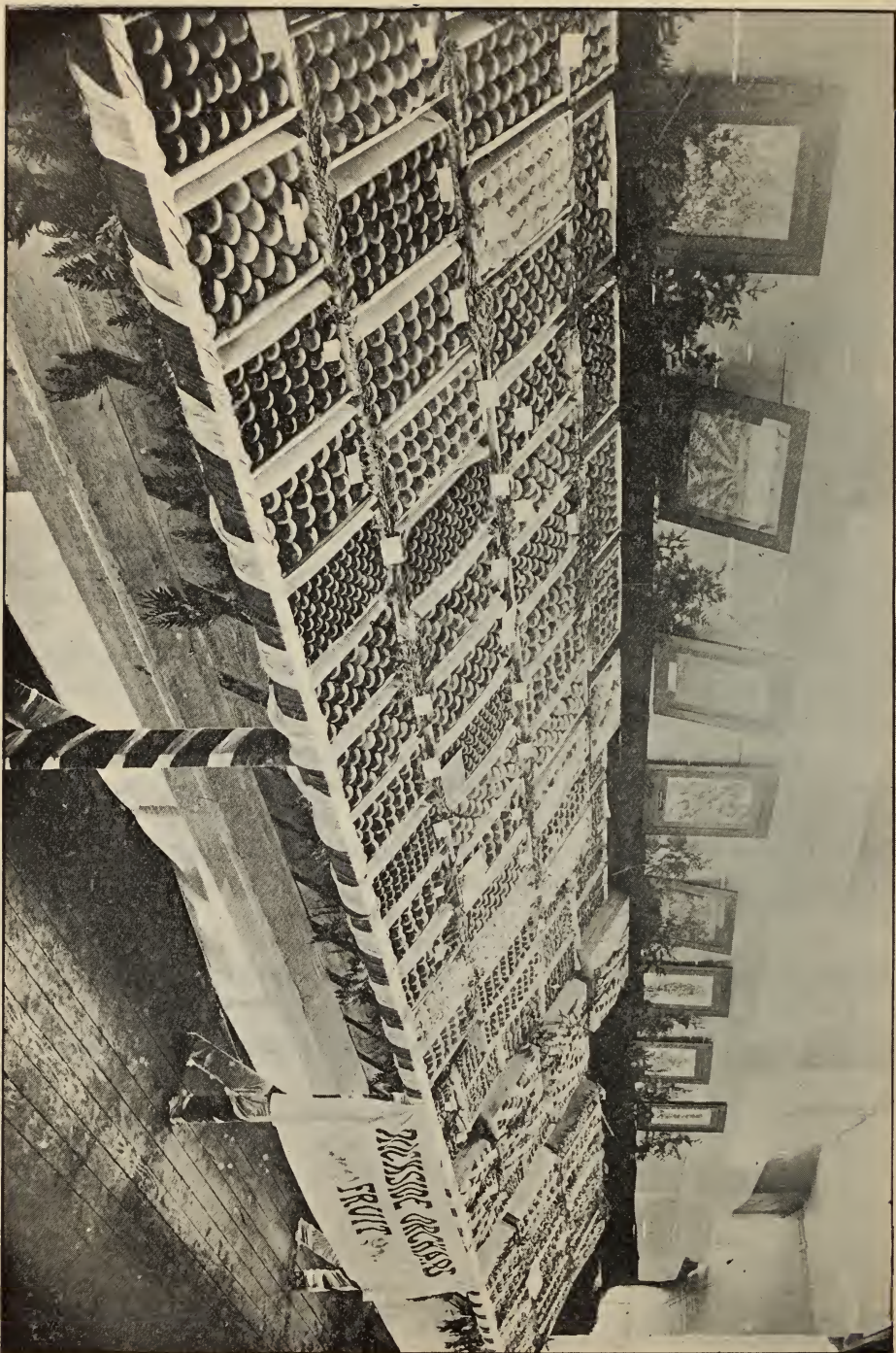
The improvement in box packing in Eastern Canada during the past two years has been a notable feature of the fruit trade, and I am pleased to say that much of this improvement is attributed to the demonstration work carried on by the Fruit Division, with the assistance of expert packers employed for that purpose.

I have the honour to recommend that this bulletin be printed for general distribution.

I have the honour to be, sir,

Your obedient servant,

J. A. RUDDICK,
Dairy and Cold Storage Commissioner.



A BRITISH COLUMBIA FRUIT EXHIBIT.

THE PACKING OF APPLES

IN

BARRELS AND BOXES.

By A. McNEILL.

INTRODUCTION.

It is the object of this bulletin to describe the chief features of barrel and box packing. The principles involved are few and easily mastered. The art of doing the work is a more difficult matter. Practice alone will secure proficiency in this. It is believed that a careful study of the cuts made from photographs of packed boxes and the diagrams illustrating the details of these will be of great assistance to the beginner.

BARRELS.

In Eastern Canada, the greater portions of the fruit will be shipped in barrels for many years to come. The culls and lower grades should be shipped only to the evaporator, the canning or vinegar factory. A large proportion of the remainder can be sent to market with advantage, in barrels. Only a small proportion of the fruit will pay in boxes. This must be a Fancy grade or a No. 1, strictly graded to size and colour.

Barrels, therefore, still maintain, and are likely to maintain, their pre-eminence as a package for apples.

The minimum size of a standard barrel containing 96 quarts is prescribed in the Inspection and Sale Act as follows:—

Between heads, $26\frac{1}{2}$ inches inside measurement.

Head diameter, 17 inches inside measurement.

Middle diameter, $18\frac{1}{2}$ inches inside measurement.

This barrel, in common use in Nova Scotia, is made from 28-inch staves. The barrel in common use in Ontario is made from 30-inch staves. Its dimensions are as follows:—

Between heads, $27\frac{1}{2}$ inches.

Head diameter, 17 inches.

Middle diameter, $19\frac{1}{2}$ inches.

The size varies according to the jointing of the stave which may be $\frac{1}{2}$ inch, $\frac{3}{8}$ or $\frac{5}{8}$. The size will vary somewhat also with the width of the stave.

There should be sixteen staves to the barrel, but it is impossible to secure uniformity in size, without uniformity in the jointing as well as in the number of staves.

The specifications for a good apple barrel call for a sound stave with $\frac{3}{8}$ -inch jointing, cut 5 to 2 inches, and averaging 4 inches in width at the bilge, free from large knots or shakes. The head not less than a $\frac{1}{2}$ inch in thickness dressed, clear and sound. The hoops should be $\frac{3}{8}$ on the thin side to $\frac{1}{2}$ inch on the other, in thickness, by $1\frac{3}{8}$ inches in width and eight in number.

In Nova Scotia, the use of split hoops are quite common. These are made of birch or alder, and though they do not have quite the neat appearance of the elm hoop, they are very strong and cheap.

SECOND-HAND BARRELS.

It cannot be too strongly impressed upon apple-growers that they should use no packages which are not absolutely clean and bright. It is a mistake to use second-hand barrels, even for the local market. For the export market it is absolutely impossible to make a profit if second-hand barrels are used. These will be sold by themselves, and notwithstanding the quality of fruit that may be in these packages, they will, on the general market, be sold at a reduced price.

HOME COOPER SHOP.

An increasing number of large fruit-growers and co-operative associations are putting in a cooper outfit for their own use. A serviceable outfit will not cost more than \$50 to \$75, and any vacant outbuilding can be very readily fitted up for barrel-making. But the better way is to train the ordinary help on the farm so that they can work at these barrels during the winter months and other times when work is slack upon the farm. Any handy man with slight instruction can soon learn to make an apple barrel for all practical purposes as good as the best.

There are several advantages in making the barrels at home. Stock for barrel-making can be bought early in the season and is easily stored in this shape without taking harm. The price, therefore, is usually a third less than when an order has to be placed hurriedly with a cooper. Not only is the price less, but the chances of being left without a stock of packages is minimized. Perhaps a more important inducement for making barrels at home would be that labour would be employed on the farm, so as to make it possible to retain men the whole year round. One of the most serious problems on the farm to-day is the labour problem, and farseeing fruit-growers believe that they can best solve this by furnishing twelve months' work for men, instead of six months', as formerly. Making barrels at home will help the fruit-grower to secure and retain a better class of labour.

BARRELLING APPLES.

It is probable that a very large part of the fall and early winter apples will be packed for market in the orchard, and excellent work can be done there, if proper provision is made for both picking and packing. The most convenient packing bench for orchard use is made on the same principle as the ordinary stretcher couch or like an enlarged saw-horse, with a bolt where the supports cross each other. The upper points of these supports are joined with a 2 x 2 strip, as long as it is required to make the table, and on these pieces of timber a sheet of stout burlap is fastened securely. When this is opened and braced with light pieces below, it makes a very convenient packing bench, which can be carried about from point to point by a single workman, and which will not bruise the fruit in any way. A heavy plank should be provided for the barrels to stand on and upon which the racking can be done during the process of packing. Good work cannot be done if the racking is attempted directly on the ground, and even if it were possible, it would be likely to render the barrel unsightly with soil.

The barrel should be prepared for packing as follows:—The quarter hoops should be forced down firmly, and three nails driven in in a slanting direction and clinched upon the inside. The face end of the barrel should be nailed and the headlines placed in it. The fruit for the face should then be placed neatly in the barrel. For this purpose it is well to support the barrel a few inches from the ground while performing the operation. The grade of the apples should be precisely the same in the face as in the rest of the barrel, and there should not be the slightest attempt to get high-coloured or specially perfect fruit for the face. Each apple is laid with the stem end down, the stem having been previously cut off with a stemmer. Upon no consideration should a very large or very small apple be used to finish up in the centre of the face. If the apples are coloured, the second layer should be placed so that the colour of the

apples will show through between the apples for the first layer. After this second layer is laid the apples may be turned in from the round-bottom baskets in which the graded apples have been placed. Never use any device that will require the apples to fall any distance into their place on the grading table or in the barrel. The presumption is that the grading has been done off the grading table, and that fruit of a perfectly uniform grade is put in each barrel. As each basketfull is placed in the barrel, the barrel should be shaken (racked) slightly, not so as to throw the apples against each other or against the side of the barrel violently, but just sufficiently to settle them into place. It must not be supposed that this racking can be done successfully, if it is delayed until the barrel is nearly full. When the barrel is full to within two or three layers of the top, a 'follower,' a round piece of plank slightly smaller than the head of a barrel is placed on the apples, and the packer holds this firmly in place, while he continues to rack or shake the barrel. The effect of this is to make a comparatively level surface upon which the last process or 'tailing up' can be done. It is well to note here that the 'follower' should be covered with heavy felt, such as is used by harnessmakers for pads.

TAILING.

The process of 'tailing' a barrel of apples is the severest test of a good packer. It consists in arranging the last two or more rows of apples so that they will project slightly above the barrel.

The characteristics of good tailing is to have the apples of the last two rows placed solidly and evenly, so that when finished the head will touch with the same pressure each apple exposed. This is a very difficult thing to accomplish, even where considerable time is taken in the operation, and it is only a skillful packer who can perform this operation quickly and well. It is a common fault with unskilled packers to allow one or more apples to project above the general surface. When pressure is put upon the barrel, these apples take the whole pressure at first, and are frequently crushed before the head is in place. It is advisable for young packers to take off the head of a barrel of their tailing occasionally and note the number of apples which have been touched by the head at the pressed end. If it should appear that a number of apples have not been touched by the head, and others are severely pressed, then they may rest assured that they have made a poor job of the tail. The aim should be to have equal pressure upon every apple in the last row.

It is not of material consequence whether the stem end or the blow end is placed up. It injures the apple somewhat less to have the blow end up, but the apples can be placed in a better position by having the stem end up. All stems showing either on the head or the tail should be removed with a stemmer. Do not attempt this work with a knife. This operation is frequently neglected, and long stems are pressed into the flesh of the apple, giving entrance to disease germs.

PAPER HEADS.

Heads cut from heavy paper or from light pulp board are very desirable on both ends of the barrel. The patent corrugated heads cannot be recommended. It is doubtful, too, whether there is any advantage in using fancy paper heads.

PRESSURE.

The exact pressure which must be given will depend somewhat upon the variety of the apple. If they are packed for storage or for a short trip, then the pressure need not be so heavy. If they are packed for export, it will be better to press them heavily, but not so as to break the skin of any particular specimen. It has been the experience of the fruit inspectors, who open a great many barrels during the season, that slackness in barrels is as often caused by over-pressing as by under-pressing. Over-pressing will break the skin of the apple, or bruise it severely, inducing decay in one

or more specimens, which very quickly causes slackness. Certain varieties, too, will require and stand more pressure than others. The Spy has to be pressed very moderately, as the apple splits readily under pressure; Russets, on the contrary, will stand much heavier pressure without breaking the skin, and appear to require heavy pressure to prevent slackness from evaporation.

FINISHING THE HEAD.

In finishing the barrels, six nails in each head, if properly driven, are sufficient. Liners should be used invariably, and should always be kept damp. Few packers appreciate how much is added to the strength of the barrel by the use of the head liner properly placed. There is no excuse for nailing the second end hoops. It invariably spoils some of the apples and adds nothing whatever to the strength of the barrel.

THE SCREW PRESS FRAME.

The screw press frame (fig. 1) is undoubtedly the most efficient and handy form of barrel press, especially when the iron circle press head is used in conjunction with it.

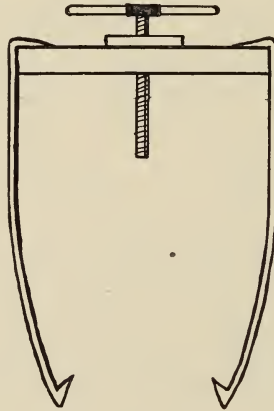


FIG. 1.

THE IRON CIRCLE PRESS HEAD.

In the ordinary wooden press head the greater part of the pressure comes upon the centre of the barrel head. To force the head into the chime, it is necessary to press the centre of the head some distance lower. After the head is firmly fixed in the barrel, and the pressure taken off, the head, of course, springs back. The apples are, therefore, subjected to fully half an inch more pressure in the centre of the barrel than is necessary if the pressure were applied near the outside of the barrel head. This can be done by means of the iron circle press head (fig. 2). It will be noted that the bars A and B in the diagram are made with an arch, as in D. It will be noted also that these bars are made with a shoulder E, to meet the inside of the iron circle C, otherwise, when the pressure comes where the two bars cross each other, there would be so great pressure on the rivets joining these to the circle that they would soon be cut off. These heads are now sometimes kept in stock by hardware men. If they cannot be procured at the hardware stores, any blacksmith will readily make one. The circle should be 14 inches in diameter, and made of quarter-inch bar iron.

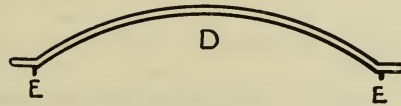
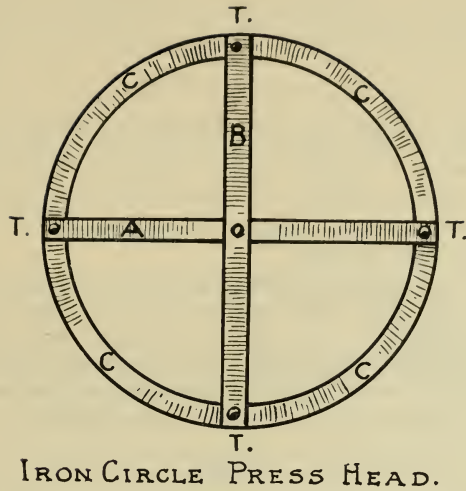


FIG. 2.

MARKING BARRELS.

The first consideration in marking a barrel is to indicate the kind and quality of the fruit which it contains, in the clearest manner possible. Consistent with this, other facts may be included, such as the name of the grower and the source of the fruit, together with any trade mark or special brand with which it is desired to associate the fruit. The Inspection and Sale Act (see appendix) makes the following marks compulsory on every fruit package:—The name and address of the packer, the variety of fruit and its grade. In the sample marking (fig. 3) nothing appears which

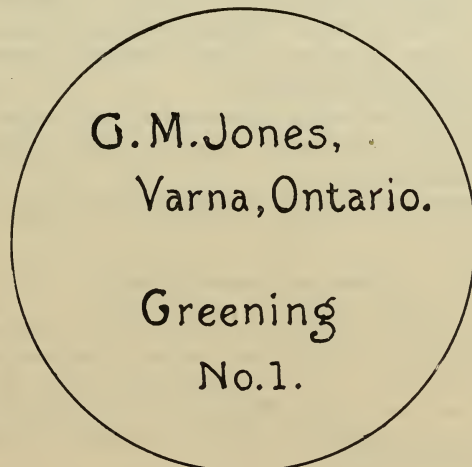


FIG. 3.

is not required by the Fruit Marks Act. It is desirable, however, to add 'Canadian apples,' and also a number designating the workman who is responsible for the actual work of packing. Such numbers should begin above 10, so as not to be confused with grade marks.

The reputation of Canadian apples is now a valuable asset to Canadian growers, hence the importance of having the word 'Canadian' appear upon all barrels exported. In addition, therefore, to the marks required by law, shippers usually arrange the stencils so that the phrase 'Canadian apples' appears as some part of it. This phrase is frequently preceded by an adjective, such as 'choice' or 'extra choice.' In this case it should be noted that such superlative adjectives as these can only be attached to No. 1 and Fancy grades of apple.

Some of the best Canadian packers have secured a trade mark which appears regularly upon their stencils. This trade mark, if it contains no descriptive phrase, may appear upon all grades.

In a few cases packers have adopted a complicated design for their stencil. This practice is not to be commended; only simple designs lend themselves to the process of stenciling. Fine lines are lost or are apt to be blurred.

NOTES.

See that no nail points project either inside or outside the barrel.

No packer can be considered strictly honest who has two sets of baskets, one for 'facers' and the other for 'fillers.' The 'facers' must be taken from the general pack.

Use the iron hoop heading block; it is much easier on the apples than the ordinary wooden press head block.

Avoid pounding unnecessarily upon the heads of the barrels to drive the heading into the chime. A few gentle taps properly directed is all that is needed.

Mark the name of the variety and the grade immediately in lead pencil near the chime, with the initials or number of the packer, to serve as a guide when the proper stenciling is done. All permanent marks should be made with stencils and brush.

Wire hoops make a very poor barrel.

In all operations in connection with packing study simplicity and directness of motion. The work is light, but every motion is often repeated. Let each operation be completed with the fewest motions possible, and therefore with the least possible effort. Having selected a method of work, let it be done the same way every time till the process becomes almost automatic.

Bad habits are sometimes unconsciously acquired by packers and sorters. Don't toss the apples about on the packing table every time you wish to select a specimen. It is quicker to select from the apples in view, and much better for the fruit.

Handle the apples as little as possible.

Cleanliness should be observed in every part of the work.

Decayed fruit should be disposed of so as not to contaminate either the packing house or the outside premises.

There should be facilities in every packing house to enable packers to keep their hands clean.

CARE OF PACKED BARRELS.

Remove barrels as quickly as possible to the shelter of some building as cool as possible above freezing point. If they are allowed to remain in the orchard, do not let them lie upon the ground. Give them the benefit of all the shade they can get. Do not allow barrels that have been packed to get thoroughly wet. Barrels that have been properly packed will usually be found to be slack after the staves have been thoroughly saturated with water.

A caution ought to be given here against packing in very dry barrels. If from any cause the barrels have become very dry, moisten them slightly inside and out before packing. Damp apples packed in dry barrels will very frequently cause weak staves to buckle inward. This is more likely to occur if the barrels are left exposed to the hot sun.

The want of care of the barrels after they have been packed constitutes one of the most serious losses in the apple business of Canada.

BOXES VS. BARRELS.

The question of boxes *versus* barrels has been discussed in Eastern Canada for a number of years. The question cannot be said to be yet settled. The British Columbia fruit-growers use no barrels; they may, therefore, be said to have decided in favour of box packing. A careful analysis of the conditions in Eastern Canada would seem to show that neither package possesses all the virtues.

In every centre of population there are a small percentage of customers who are anxious to obtain the best possible fruit and with whom the question of price is subordinate. There is also a class of customers to whom the question of price is a matter of first consideration, and who, therefore, of necessity, must take a cheap grade of fruit, upon which has been expended the least possible amount of money for packing and packages. Between these two extremes there are all gradations.

The needs of the first class can be supplied only by boxed fruit. This is a trade which is seldom or never over-supplied, paying the very highest prices obtainable, but not accessible through the ordinary commercial channels.

The customers at the other extreme can be most cheaply supplied with fruit packed in barrels, but unfortunately this market is nearly always over-supplied. It would seem, therefore, that the question of boxes and barrels is sometimes a question of customers. The customers paying the highest price demand the box, the customers paying the lowest price require barrels.

It is also a question of variety, inasmuch as the fancy trade can only be done with certain classes of apples. The apples of the highest flavour and of the greatest excellence for dessert purposes are also very tender, and consequently demand the utmost care in packing and shipping. The Northern Spy and King can scarcely be shipped in barrels so as to present a really attractive appearance, such as would be required for the highest dessert trade. In the case of the Fameuse and the McIntosh Red, it may be said that it would be absolutely impossible to ship them in barrels without marring them to such an extent that they are quite unfit for a high-class dessert trade. It is, therefore, beyond a doubt that these and similar varieties must be shipped in boxes to realize their full value.

On the other hand, the Ben Davis, Stark and similar apples have scarcely quality enough for a profitable dessert trade. They are also so strong in the fibre that they are injured comparatively little by barrel packing. It would, therefore, seem that these apples, as a matter of variety, are more profitably handled in barrels.

The question is also one of convenience. The method of harvesting and packing the apple crop, as it has developed in Eastern Canada, has adapted itself to the needs of the barrel trade. It would be impossible, however, to conduct a box trade with the same methods. It is possible, of course, to pack boxes and to pack them well in the orchard, but to do so would require skilled labour, specially trained and climatic conditions that can scarcely be depended upon in Eastern Canada. It is very difficult, if not impossible, to manage economically a box trade and a barrel trade together upon the same lines as the barrel trade is now conducted.

The following facts are well established:—

1. The highest priced apples are shipped in boxes.
2. The box is the only practical package in which an apple can be transported with any reasonable degree of economy in a fit condition for the highest dessert trade.
3. Only the best grade of apples will pay in boxes.

4. The retail merchants, other things being equal, prefer the boxes for at least a large part of their trade. The auction markets and fruit brokers of Great Britain do not take kindly to boxes.

EXPERIENCE OF CANADIAN SHIPPERS.

For the last four or five years a few Canadian shippers have each year experimented with boxes. In only one or two cases have they pronounced it a success. A fairly close inquiry into the conditions under which these experiments were carried on shows that the business was not handled in the best way. Nearly all who experimented with boxes did so with unskilled packers. In many cases the boxes were faced and then the apples were simply rolled in on top of this face after the manner of barrel packing, and finished in every respect like barrel packing, with no attempt at arranging the apples in tiers. Of course, nothing but failure could be expected from such a style of packing.

Another common mistake was the poor quality of fruit that was placed in the box, it being presumed that if the box were a better package, a No. 2 apple would bring more in a box than it would in a barrel. Such was not the case. The class of customers to whom the No. 2 apple appeals wants it in larger quantities and in a less expensive package than the box affords, and consequently he looks to the barrel, so that the No. 2 apples would probably sell for less in boxes than if they were packed in barrels.

Another factor in the case was the inferior class of box used.

It can be readily understood that where one or more of these factors prevailed, failure was almost certain. On the other hand, one or two eastern shippers have made a success of the box trade. This has been done by careful attention to all the details pertaining to the package, as well as to the fruit. No great success need be expected in box packing until skill has been acquired in the proper methods of packing a box. With skilled packers apples may be packed as rapidly in boxes as in barrels; but with unskilled packers box packing may take two or three times as long as barrel packing under the same conditions.

THE BOX.

The size of the Canadian apple box is 10 x 11 x 20 inches, inside measurement. This is obligatory for the export trade. (See Appendix 11.) It is recommended that the box should be made with the following specifications:—The end pieces not less than $\frac{5}{8}$ inch nor more than $\frac{3}{4}$ inch thick; the sides not less than $\frac{3}{8}$ inch, the top and bottom $\frac{1}{4}$ inch thick. These dimensions cannot be changed to any great extent. If the ends are thicker, there is an unnecessary weight of wood and a clumsiness in appearance that detracts very materially from the value of the box. It is important that the sides should be heavy enough not to yield too easily to pressure in packing. If the sides are thinner than $\frac{3}{8}$ inch, the pressure exerted by the packing of the third and fourth layers will render the first and second layers slack.

On the other hand, if the sides are heavier than $\frac{3}{8}$ inch, an unnecessary weight is given to the box. In actual practice it has been found that there can be little deviation in the thickness of the top and bottom. Three-eighths inch is so thick that it is impossible to get the proper swell on top and bottom, and the fruit in the box soon goes slack. It cannot be lighter than $\frac{1}{4}$ inch, unless the wood of which it is made is exceptionally good, as it will not be strong enough.

Too frequently there is very great carelessness as to the quality of the material that is put into the box. A deficiency in the quality of the wood cannot be made up by increasing the thickness of it. If the material for the ends is not good enough for a $\frac{5}{8}$ inch thickness, it is not good enough when it is made an inch thick. This applies with even greater force to the top and bottom. No matter what variety of wood is used, it must be strong, elastic, straight-grained and should be entirely free from shakes and knots. Many of the boxes used in Eastern Canada have been made from

sap-wood, more or less dead. Of course, when there is any attempt made to give the proper swell in the packing, these covers break. This has led some inexperienced packers to try a heavier top and bottom, which has proved disastrous to securing the proper shape to the box when finished. The best available variety of wood is probably white spruce, but many different kinds may be used for the ends and sides, though no wood is suitable for the top and bottom except such as possesses very great strength and elasticity.

Opinions vary as to the importance of each dimension of the box being in one piece. Beyond a doubt, the ends should be of one piece under all circumstances, and it is much better to have the sides of one piece, and nearly all packers agree that the face is better in one piece, but it is maintained very strenuously by some packers that they can secure a better finish and a firmer pack by having the bottom (the last part put on) in two pieces, so as to secure practically a double bulge.

It is needless to say that all the timber entering into the box should be of such a kind that it can be neatly worked so as to leave a smooth surface from the saw, though one side at least should be dressed. No wood should be used that will impart an odour to the fruit.

Dovetailed boxes are not a success with fruit.

Boxes made of good timber and properly nailed with waxed nails do not need to be strengthened with wire or hoop-iron bands.

NAILS.

The proper nails to be used are four-penny rosinced (or, as they are sometimes called waxed) nails. They hold better than the corrugated or the smooth, and are as easy to drive as the smooth nail. Four nails each should be used for the sides, bottom and top.

CLEATS.

Cleats should be used on top and bottom. When nailing on the top and bottom, nail through the cleat. If there should be any tendency to split the cleat, soak it in water.

Cleats are necessary on every properly packed box:

1st. To protect to some extent the bulge on the top and bottom.

2nd. To strengthen the top and bottom pieces, which are likely otherwise to split and break where the nails are driven.

BOXES IN THE FLAT OR SET UP.

In Eastern Canada it is usual for those supplying the boxes to set them up at a very slight increase on the cost in the flat; but if they are to be shipped long distances, it would be a great saving in freight to have them sent in the flat. It is not a difficult nor a long process to nail them together in the packing house, and they occupy so much less room that many growers consider it the preferable way to order their boxes.

A convenience in nailing the boxes can be placed on any ordinary bench. Pairs of cleats are nailed to the bench so as to hold the box ends in position, 20 inches apart and perpendicularly. The sides can now be nailed in position and then the bottom. It is estimated that the nailing can be done for 1½ cents per box.

WRAPPING.

Whether the apples should be wrapped or not depends somewhat upon the variety and the grade of fruit. Wrapping has several advantages:

1. It serves as a cushion in the case of delicate fruit.

2. It prevents rot and fungous diseases from spreading from specimen to specimen.

3. It maintains a more even temperature in the fruit.
4. It has a somewhat more finished appearance, when exposed for sale.

Wrapping has also some disadvantages:

1. It adds to the cost of packing.
2. It prevents rapid cooling in cases where the fruit is not cool at the time of packing.

The general rule to be applied is that wrapping pays in the case of high-priced tender fruit, and where it is essential to use every means to lengthen the life of the fruit.

Double wrapping and the use of waxed paper is of use where extraordinary precautions are needed to preserve the fruit.

WRAPPING PAPER AND WRAPPING.

Wrapping paper is now made of a special brand to suit this trade, and is for sale at most of the wholesale dealers. The sizes mostly in use are cut 8 x 10 and 10 x 10, though other sizes can be obtained. One side of the paper is calendered, and the other not. The uncalendered or rough side is placed next the fruit. The wrapping of the fruit is a process requiring 'neatness and dispatch.' Each packer has his own method of performing the operation, but the following hints may be useful:—

Have the paper conveniently placed on the left side. Pick up a sheet between the thumb and finger so that when the hand is turned over, it is in such a position that the right hand may place the fruit to be wrapped in the centre of the paper. The fingers of the left hand then turn the corners up, and they are caught by the right hand, and a single motion will bring the ends together with the double folds over the stem of the apple. A careful analysis of the methods employed by skillful packers show that they make no unnecessary motions in their work. As with the packing of the fruit in the box, so with the wrapping.

LAYER PAPERS.

Sheets of heavy paper or light pulp board are often placed between layers. On the whole, they seem of doubtful utility. The layer paper or light paper board does not maintain its elasticity. The moisture which it absorbs from the fruit or the air causes it in the course of time to take the shape of the apples which it touches more closely, and thus renders the whole box slack. If in this condition it is carefully handled, it may take no harm. With this exception, the layer papers are beneficial. They tend to prevent initial pressure bruises, and also prevent the spread of decay. They are scarcely needed even for this in the case of wrapped fruit.

LINING PAPER.

Lining papers for the boxes are not often used. At the Ontario Horticultural Exhibition for 1906 not more than 25 per cent of the boxes shown for prizes were lined. The practice, however, is to be commended. It costs but a trifle and adds greatly to the appearance of the box. By excluding dust the lining papers serve a useful purpose from a sanitary point of view. The paper should be in sheets 19 x 26. Two sheets are required for each box. The sheets are placed in the box on each side, lapping over the bottom slightly, and having a fold in the corner, so that the paper will not be torn when the pressure is put upon it in nailing on the cover. The box is then filled, a similar fold is placed in the upper corner, and the two sheets then lapped over the top.

PACKING HOUSE.

A permanent packing house is almost an absolute necessity for the best work in box packing. The ordinary packing house, with insulated frost-proof walls, suitable for storing winter fruit is, after all, the best packing house even for summer use.

The advantages of it are many. Fixtures can be made permanent and therefore convenient. There is no time lost in shifting from one part of the grounds to another. The discomforts of disagreeable weather are reduced to a minimum. Perhaps of more importance than any of these considerations is the fact that the fruit may be kept cooler in hot days in such a house than in an open shed. In all such houses there should, of course, be ample ventilation, by means of large openings in the highest part of the wall or ceiling. If then this building is thrown open during the night and kept fairly well closed during the day, the temperature can be moderated to such an extent that even without cold storage for the greater part of the season, apples could be packed successfully and placed directly in refrigerator or ordinary cars. Such houses, too, are always useful for temporary storing purposes, enabling the owner to make the most of his labour and his fruit.

Of course, good packing can be done in the open air, but it requires much more attention, and the results are by no means certain. It is very uncomfortable packing in the chilly mornings and evenings, or in windy weather. A great deal of valuable time is lost because work dare not be attempted outdoors, even when the weather is merely threatening.

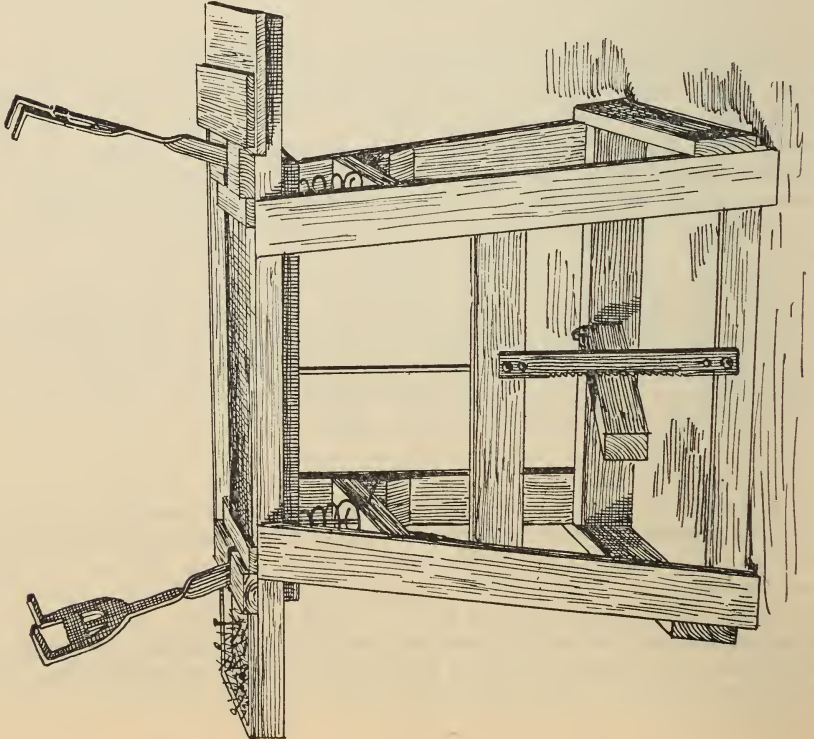
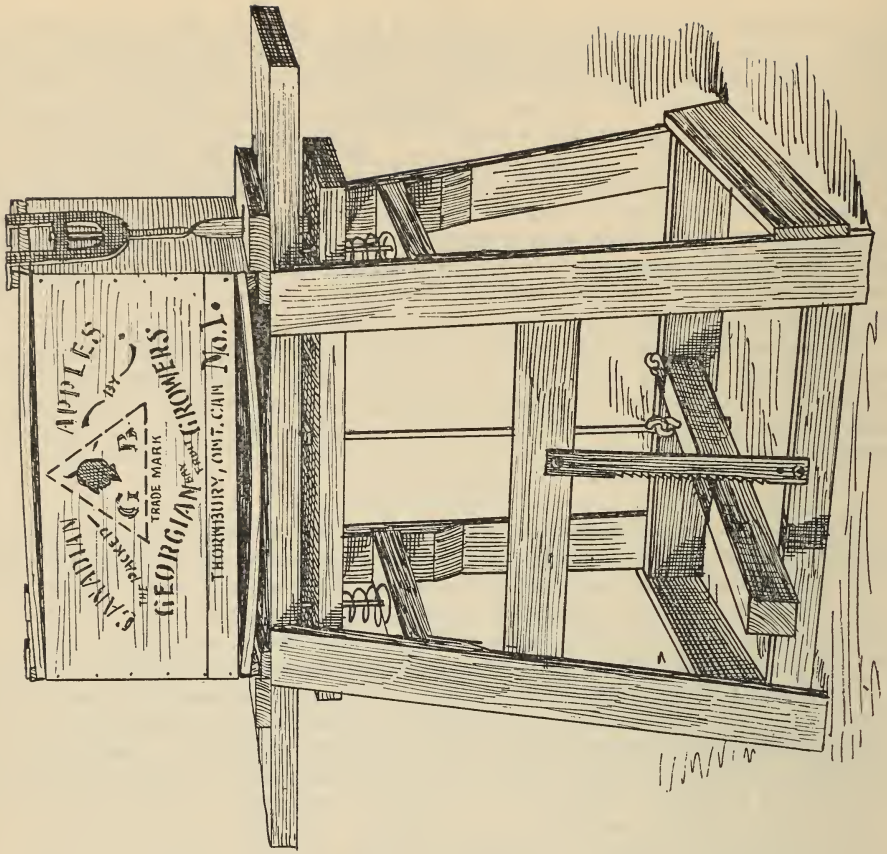
PACKING TABLE.

For the best and most rapid work, packing tables are absolutely essential. These should be of two sorts, as the apple business is conducted in Eastern Canada. It is impossible to get packing and grading done at the same table economically. Therefore, after the apples are brought into the packing house, the first operation is grading them into four grades: Fancy, No. 1, No. 2 and Culls. This may be done by help that knows nothing of the practical part of box packing, or rather, it is the initiatory work for box packing. The grading is best done on tables lined with canvas or burlap. These tables may be placed about the wall, working from one side or away from the wall, when work may be done from both sides. Usually it is more convenient to place these tables against the wall, the back of the table being slightly raised and of a height suitable for the people who are grading. The standard height of three feet is usually regulated by a platform of planks running in front of the table, which may be raised or lowered by means of blocks to suit the height of the graders. The packing table for the use of those who place the apples in boxes are better made so that they can be placed in the central portion of the room, but where there is good light. This table should be lined with burlap and made so that the height can be easily regulated and large enough to contain three or four boxes of apples; the size in common use is three feet wide by four or five feet long and six inches deep. Such a packing table will accommodate two packers. A board should be nailed across the end as high as the top of the table and should project twelve or fourteen inches, the projection supporting one end of the box to be packed. The other end of the box is supported upon a board six inches wide, nailed to the bottom of the packing table and projecting from the end. Similar supports for a box are arranged at the opposite corner of the table, so that two packers can work with their right hand towards the packing table. The usual height of the table is three feet from the top of the table to floor. But this height must be varied to accommodate the height of the packer. The sorting and packing tables should be lined with an extra sheet of burlap, fastened so that it can be easily taken out and be shaken clean of all the debris that will inevitably gather on the tables.

NAILING BENCH.

After the packing is completed, the cover must be carefully nailed in position. The lining papers are folded neatly at the edge of the top of the box to allow for the swell, and will then overlap slightly at the centre. This is done on the nailing bench—an accessory too often thought unnecessary. The staff of the Fruit Division has been using a bench illustrated in Plate I. This is the style, with some modifications, in general use on the Pacific Coast, and can be readily made by any one handy with tools, with such assistance as may be obtained at any blacksmith's shop.

PLATE I.



In putting on the cover, drive all nails through the cleats. Four nails in each end is quite sufficient.

GRADING.

The basis of rapid box packing is good, even grading. The packer should have before him an even run in point of size, without which it will be impossible for him to do rapid work, or indeed do good work. Grading for quick, good work in box packing is, of course, dependent largely upon size and colour. It will not do to place apples of markedly different sizes in the same box. It is desirable neither for appearance nor for rapid packing. No accurate calculation can be made upon the style of pack, and no uniformity can be secured in the layers, if the sizes are markedly different. Nevertheless, it is impossible to secure in the apple perfect uniformity in size and shape. But this inequality in size and shape must never be so great as to offend the eye of the fastidious customer. But it is upon these very slight differences of size and shape that the best qualities of a good pack depend. It must not be understood that any good packer will associate two apples differing materially in size. The really skillful packer will take the very slightly smaller apples and use these at the ends of the boxes, the larger always going towards the middle of the box. But this difference in the size of the end and the middle apples is so slight that only the practised eye of the packer would detect it. The skilful packer will also take advantage of the slight inequalities in shape. Very few apples are exactly symmetrical, whether you cut them from stem to basin or transversely. If then the packer finds that there is a slight slackness in a row of apples which he is packing across the box, he can usually make this perfectly tight by simply turning the specimens one way or the other. Of course, the opposite fault of being somewhat too crowded can be remedied by the same process. Thus the packer will build up a layer from end to end of the box with apples slightly smaller in the ends, with the larger ones towards the middle of the box, and yet the most critical customer would not be offended by any difference in the specimens. It is perhaps not equally important to grade to colour, yet this adds greatly to the appearance of the finished box. If then the packer has the choice, he will put the lighter-coloured apples in one box and the highly-coloured apples in another. Both boxes may sell equally well, but neither would have sold so well had the apples been mixed in colour in each box. It may not be superfluous to say that it is presupposed that no wormy or scabby apples are permitted to go into boxes. This would exclude a very large part of the apples in eastern orchards. It may as well be understood, once for all, that the packer who has no higher conception of the box business than to think of it as a receptacle for scabby or wormy apples, had better pack his apples in barrels. He will get a much better price for them, and will not be lowering the reputation of the high-class apples that should be packed exclusively in boxes. It may be well here to draw attention to another matter of observation, namely, that very few men who have been used to barrel packing ever succeed in the box trade. Rougher methods that have served them in the barrel trade are unconsciously practised when they take up the box trade, and failure is the inevitable result. Barrel packers, therefore, who do attempt the box business must divest themselves entirely of many habits and methods of work that may not have interfered with their being fairly successful as barrel packers.

The following circular, issued by the Hood river, Oregon, Fruit Growers' Union to their members, gives the standard of grade for their celebrated brands of apples. It corresponds very closely to the Fancy and No. 1, defined by the Canadian Fruit Marks Act. There is not the slightest doubt that if the Fancy and No. 1 grades, as grown in Canada, were packed with equal care and were placed upon the market with the same business tact, equally good prices could be secured.

The stings referred to in the circular are scars completely healed over, with a skin as sound as any other part of the apple. All fruit affected by scab and Codling Moth is rejected absolutely.

Special Instructions given out by the Hood River Fruit Growers' Union to their Members.

'Only two stings on one apple will be accepted on all first-grade apples. Any worm sting must not be larger than $\frac{1}{8}$ of an inch in diameter, measured from outside of green ring around said sting. No sting may show an open hole; $4\frac{1}{2}$ and 5 tier apples should not show over one sting, unless said stings are very small. Limb or leaf-rubbed or other like defects will be accepted where said defect does not break the skin of the apple, providing said defect is not larger than a 10-cent piece, if said defect is circular; if it is oblong in shape, it must not be more than three-eighths of an inch wide and three-quarters of an inch long. This shall apply to defects caused by cut worms while small, providing any defect does not materially affect the shape of the apple. Stemless apples will be accepted when the flesh of the apple surrounding said stem is not broken. All apples must be clean, fully matured, of good colour, free from any insect pests, fungus, rust, decay or injury, except as herein specified. Deformed apples will not be accepted. Packers are cautioned to look out for wind-falls and bruised apples. Green apples that will never mature will not be accepted. Spitzenbergs, Newtowns, Arkansas Blacks, Red Cheeks and Hydes Kings must all be wrapped in printed paper, boxes lined, layer paper between layers and on top and bottom. The foreman will be notified about wrapping each other variety as it is sold. Spitzenbergs sold as Red must have 70 per cent or more red colour. Spitzenbergs and Newtowns that pack 5 tier must be packed in Oregon boxes. This does not apply to other varieties. These instructions will be followed on all our packs, except the clause pertaining to colour, on which special instructions will be given for the different varieties.

'4-tier apples include nothing smaller than 128 size.

'144 size is special.

' $4\frac{1}{2}$ -tier includes 150 to 175 size.

'5-tier includes 185 to 200 size.

'Do not pack in dirty boxes.

'Every one should keep his hands clean, so as not to soil the paper or dirty the boxes in handling.'

STYLE OF PACK.

The simplest method of packing a box of apples is nothing more than the barrel pack practised with boxes. The face is placed upon the box by a method quite similar to that of facing a barrel, and the apples are then placed on the top of this face with no regard to regularity. It is needless to say that such a method of packing a box will result in absolute failure. It has been tried in Eastern Canada many times, and always with disastrous results. The box is not nearly so well suited to this style of packing as the barrel, and consequently it is more difficult to get a tight package; and if a tight package can be obtained, it is not acceptable to the customers. Nothing further need be said with reference to this style of packing, except that it is condemned by every one familiar with the box trade in apples.

PACKING IN TIERS.

One very great advantage of boxes is that close distinctions in size and colour are easily made. Customers then can secure exactly what they wish with reference to these two qualities. The number of apples in a box can be determined almost instantly by the style of the pack, but this number should always be placed on the end of the box by the packer, when he completes his work. Apples, even of the same variety and upon the same tree, vary so much in shape that it is quite possible to get an almost endless variety of packs, all fairly regular. Some practised packers claim to distinguish sixty different styles of pack. This is quite possible, if we count not only the distinct varieties of pack, but also combinations of these varieties in the different layers of the box. It is not necessary, however, to be familiar with so many

packs in order to be successful as a box packer. Familiarity with half a dozen or more will enable an intelligent person to pack successfully all common varieties, and, having learned to use these half-dozen styles of pack, the packer will have little difficulty in combining the features in these for the purpose of packing any odd size or shape that may present itself. In a general way, the size of the apples is indicated by the number of tiers or layers in the box. The box is supposed to be open, so that it is eleven inches wide and ten inches deep. If then, three layers or tiers of apples will fill the box properly, that sized apple is spoken of as a 3-tier apple. In the same way, if five layers or tiers fill the box, the size is said to be 5-tier. The 3-tier apples would be the largest that would be packed, such as the Alexander or overgrown specimens of the King and Spy. These may be so large that only 45 will go in a box. It is possible to get a 3-tier apple with 63 in a box. In the same way, a 4-tier apple usually contains 96 specimens, but it may contain as high as 112.

If the apples of one layer are placed in the spaces between the apples of the one below, there would be, say, 4 layers of apples intermediate in size between those that would fill the box in three layers or in four layers if packed directly over each other or straight pack. Such intermediate size would be styled a $3\frac{1}{2}$ -tier size. Similarly, the intermediate size between a straight 4 tier and a straight 5 tier would be spoken of as a $4\frac{1}{2}$ tier. A packer, however, soon learns to associate the number of specimens in a box with the particular pack which he adopts.

From the smallest Fameuse that should be packed, to the largest Kings or Alexanders, there are between 35 and 40 different sizes, each of which requires a different style of pack. But let the beginner in box packing take heart. These different styles of packing are really only modifications of two general types. The first is called the 'Straight' pack, where every apple but those in the first layer is directly over another. The second is called the 'Diagonal' pack, in which no apple is directly over any other which it touches. Usually, the apples in the alternate layers are directly over each other, but never in the contiguous layers.

The 'Straight' pack is modified by the number of layers in the box. When the box contains three, four or five layers, each apple directly over another, the pack is said to be straight, 3, 4, or 5 tier respectively. Each straight pack is again modified by placing the stem up or down, towards the side of the box or towards the ends. Even so slight a change as placing the stem one way in one layer, and the opposite way in the next, will sometimes make the difference between a tight and a slack pack. As there can thus be four or more modifications of each of the three packs, twelve or fifteen classes of apples, differing in size or shape or both, can be packed in this way.

The diagonal packs may be modified even more freely. These are shown in great variety in the accompanying photographs of packed boxes. A modification of the diagonal pack in common use is called the 'Offset.' Place three apples touching each other, but leaving a space about the width of half an apple between one side of the box and the last apple. The next row of three would be placed so as to leave the space on the opposite side. A very useful diagonal pack is made by placing three apples in the first row, one in each corner and one in the middle. The second would then be made with two apples, the third with three, and so on, until the tier is completed. The second layer would be commenced with two apples and alternated with three, as in the first layer. The first and third and fifth layers, and second and fourth would be the same, and directly over each other. By commencing this pack with two apples, instead of three, the box will contain two apples less. With larger apples, the 2-2 pack is used. This is begun by placing an apple in one corner of the box and then dividing the remaining space evenly with another apple. Into these spaces are pressed two apples forming the next row. This is continued till the box is filled. Four layers will fill the box, the first being directly over the third, and the second over the fourth.

PACKING THE SAME SIZE IN DIFFERENT STYLES.

It is often possible to pack a certain size more than one way, and have the box in each case look equally full and appear equally tight. It will usually be found that

one of these ways will take a few less apples than the others. In such cases, choose the pack that will take the most apples. This is not advised for the sole purpose of giving the purchaser the full quantity of fruit, but to ensure good carrying qualities. If one style of pack takes 172 apples and another 176 of the same size, which is quite possible, it is certain that there is space unfilled in the box for four apples. This space in the case of skilful packing may be so evenly distributed throughout the box that the difference in the size of individual spaces between the different styles of pack will not be noticeable. If the fruit does not stay long in the box, all the styles of pack may come out in good condition. But if the conditions are not just favourable, and the fruit is subject to excessive evaporation and rough handling, the style with the most apples will stand up much longer than the other. After the apples have shrunk slightly, a very little shaking, such as would be experienced in passing over rough tracks or in shunting cars, will cause the apples in boxes with the fewer specimens to adjust themselves into the spaces, and then the box becomes decidedly slack, and in due course wasty.

FOR BEGINNERS.

Never attempt to fill a space with an apple decidedly smaller than the rest of the apples being packed. If the row cannot be tightly filled by turning the apples slightly, it can be assumed that the wrong style of pack has been chosen, and another must be tried. A partial exception to this rule is sometimes seen in the case of the diagonal pack, even in the work of good packers. It is one of the characteristics of a good packer that he almost instinctively chooses the right pack.

It sometimes seems necessary for beginners, and indeed for all but the most skilled to deviate somewhat from the regular pack. For instance, in a 4-tier box, straight pack, it is occasionally convenient to pack the second, or the second and third layers on the side, and the others on the end. Such expedients must be a confession of partial failure, and only to be tolerated till more skill is acquired.

A careful study of the accompanying plates, made from photographs of boxes packed in different styles, will be the best means of learning the various devices of the box packing for those who have not the advantages of a personal instructor. Diagrams have been inserted of numerous packs for the purpose of showing still more clearly the arrangement in the boxes of the different layers, as well as the arrangement of each apple in the layers.

In selecting a style of pack to suit a particular size of apple, the beginner will find it a great help to make a preliminary trial with a single row of apples across the end of the box, then from the bottom to the top, and lastly from end to end, maintaining the apples in the same position for the three dimensions.

The art of packing can only be learned by *packing*. It requires a deft hand and a well-trained eye, so that slight differences of size and shape may be recognized and utilized to fill the box, not only full of apples, but so tightly packed that the box may be put on end with lid off, and yet no apples fall out. This is rather a high standard, but one that should be aimed at by all who expect to become proficient in the art.

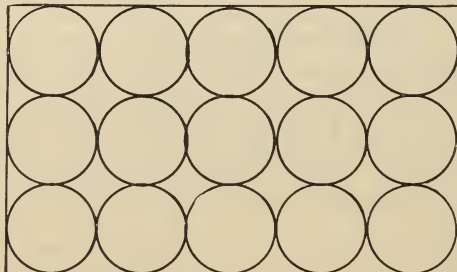


FIG. 4.
STRAIGHT PACK.

3 Tiers ——— No. in box, 45.
3 Layers all Packed the Same.

The largest 3-tier apples are packed as shown above, all the layers being the same, and each apple being directly over the one below it.

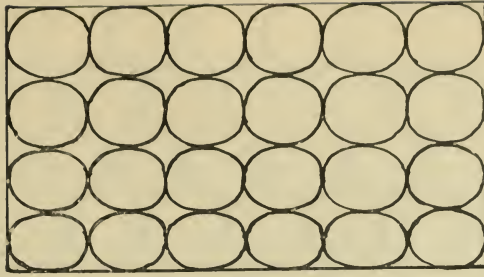


FIG. 5.

STRAIGHT PACK.

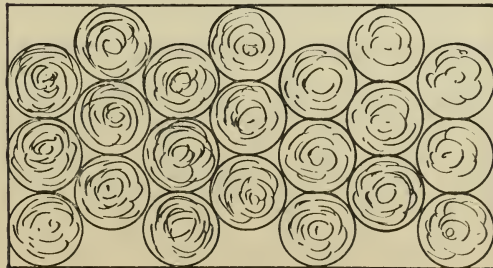
4 Tiers——— No. in box, 96.

4 Layers all Packed the Same.

Boxes packed in this manner may contain 96, 112, 128 or 144 apples, depending upon the size and shape of the apples. With very flat apples, 160 may be packed in this way.



(a) 1st and 3rd Rows.

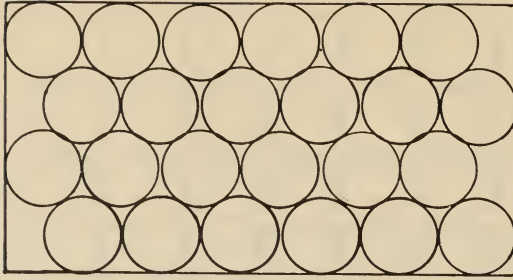


(b) 2nd and 4th Rows.

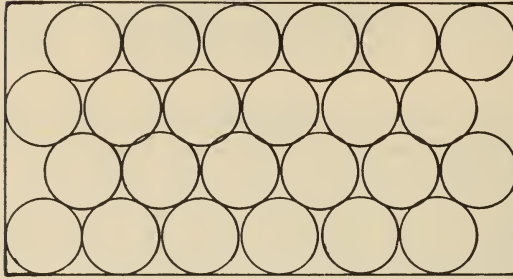
FIG. 6.

OFFSET PACK.

3½ Tiers——— 4 Layers——— 84 Apples

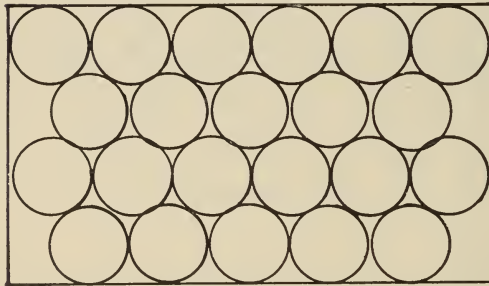


(a) 1st and 3rd Layers.

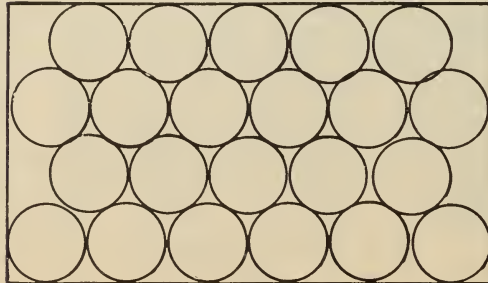


(b) 2nd and 4th Layers.

FIG. 7.
DIAGONAL.
"2-2 Pack."
 $3\frac{1}{2}$ Tiers——4 Layers——96 Apples.



(a) 1st and 3rd Layers.



(b) 2nd and 4th Layers.

FIG. 8.
DIAGONAL.
"2-2 Pack."
 $3\frac{1}{2}$ Tiers——4 Layers——88 Apples.

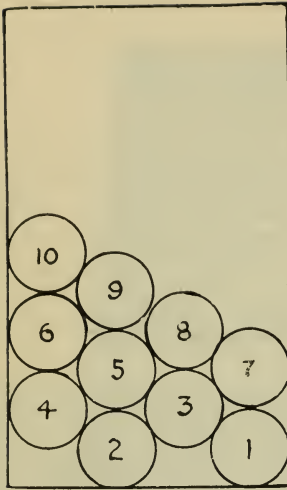


FIG. 9. How to start a "2-2"
Diagonal Pack.

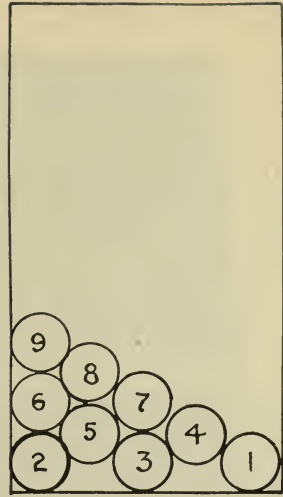
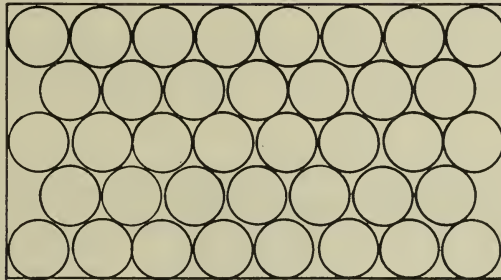
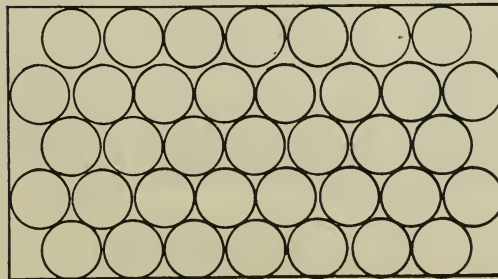


FIG. 10. Method of starting a
"3-2" Diagonal Pack.



(a) 1st, 3rd and 5th Layers.



(b) 2nd and 4th Layers.

FIG. 11.
"3-2 Pack."

$4\frac{1}{2}$ Tiers ——— 5 Layers ——— 188 Apples.

If the 1st, 3rd and 5th layers are packed liked (b), and the 2nd and 4th layers like (a), then there will be 187, instead of 188 apples in the box.

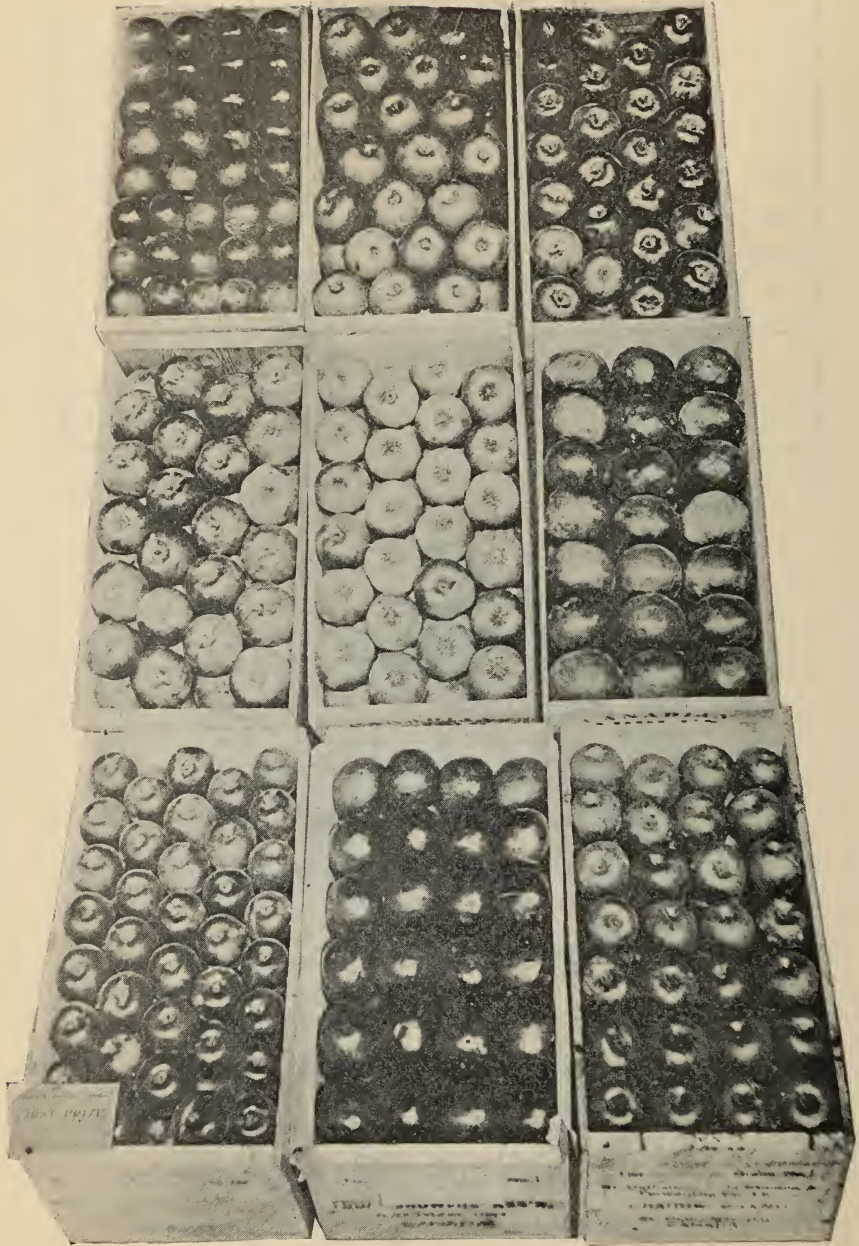


Plate 2 shows several different styles of pack. The upper left-hand box has five rows, straight pack, for part of the face layer, and four for the remainder. This device is quite unnecessary and seriously mars the looks of the pack.

The middle box of the upper row is an 'offset' pack, not desirable, if any other can be used. When opened on the side, the spaces are prominent. (See Fig. 6.)

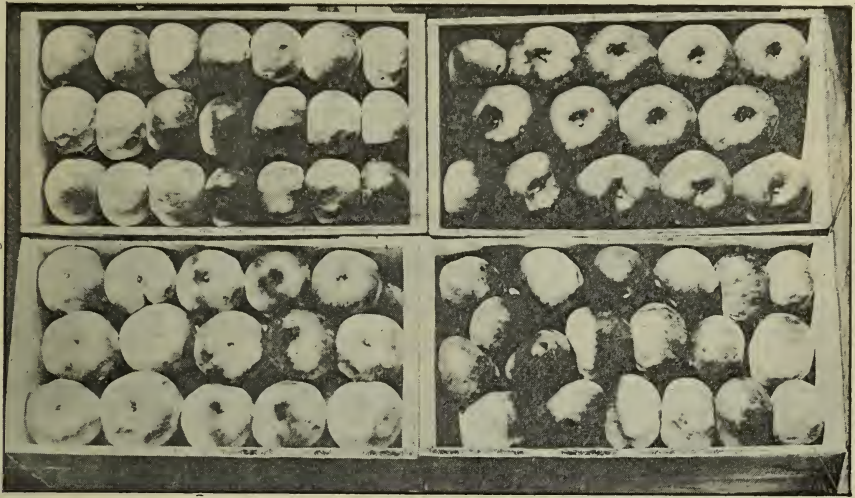
The upper right-hand box is a $3\frac{1}{2}$ -tier 2-2 pack. (See Fig. 7.)

The left-hand box of the middle row is a slight modification of the same pack for larger apples, there being only 88 apples, instead of 96, in the box. (See Fig. 8.)

These 2-2 packs, although arranged in rows of two across the box when viewed as a diagram, are not placed in the box in this order. Fig. 9 shows the order in which the apples are placed in position. 1 is placed in the corner of the box, the remaining space is then evenly divided by 2, then 3 and 4 are placed. 5 and 6 will make the first complete diagonal row. The rows are continued diagonally until the layer is complete. Similarly, the 3-2 pack, shown in the lower left-hand corner, Plate 2, would be commenced by placing an apple in each corner at one end of the box, then a third apple dividing the space between them evenly. In the spaces between the first three, place two more apples, after which the diagonal rows are completed in the order shown in Fig. 10.

Fig. 11 gives a complete diagram of the 3-2 pack.

PLATE III.



(a)

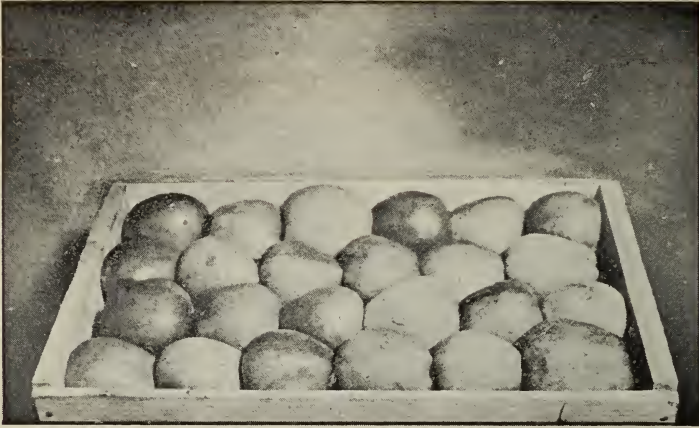


(b)

Plate 3 (a) shows four boxes of Alexanders. The upper right-hand box is a straight 3 tier, containing 45 apples, but shows the defect of having one row smaller than the rest. The right-hand lower box is a 3-tier (63). The left-hand upper box is a 3-tier (57), but defective in grading to size. The lower left-hand box is a very even pack, larger than 3 tier, containing 41 apples.

Plate 3 (b) shows how wrapped apples will accommodate themselves somewhat more easily than unwrapped to the different styles of pack, owing to the elasticity of the paper covering.

PLATE IV.



(a)

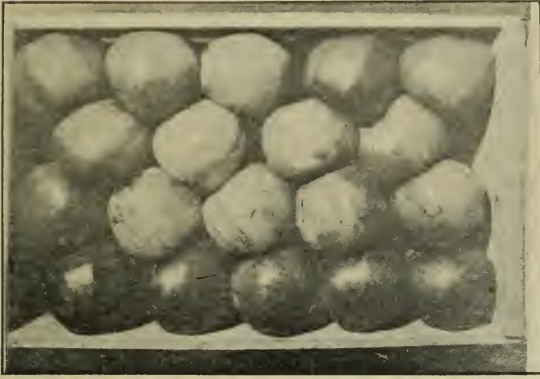


(b)

Plate 4 (a) illustrates a very neat pack for a conical apple, like certain types of Northern Spy and Ben Davis.

A different treatment is shown in the two diagonal packs in Plate 4 (b). It will be noted that the left-hand box has 20 apples in each layer, while the next has 18.

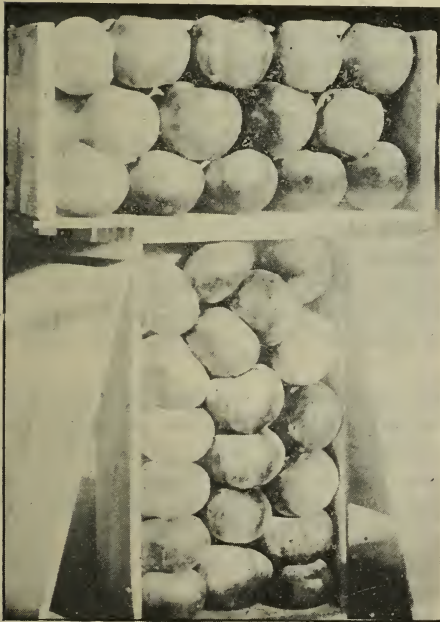
PLATE V.



(a)

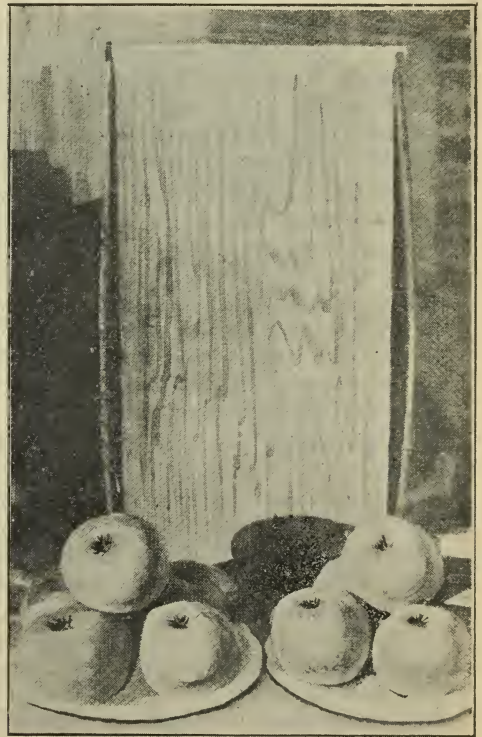


(c)



(b)

3296.



(d)

Plate 5 (a) shows a diagonal pack, sometimes necessary with large, irregular apples. There are three layers, with 19 apples in each.

In (b) the side of the upper box is removed to show the second layer. The face of this box is shown in the lower left-hand box in Plate 3 (a), which see. The first and third layers have each two rows of five apples and one of four. The second layer has two rows of four apples and one of five, making 41 in the box.

The lower box is similar in pack to (a) in the accompanying plate.

In (c) two straight 4-tier boxes are shown, one containing 144, the other 160. The apples in the right-hand box are only very slightly smaller than those in the left-hand box. In the one case the stems are towards the side of the box, in the other towards the end. These boxes were packed from the same lot, graded by an experienced barrel packer and pronounced a very even grade in size by a number of other packers who examined the loaded table before the packing was done. The skilled box packer was obliged to make the slight difference in the style of pack shown here, and select his sizes accordingly. The time taken for the packing of the two boxes, from start to finish, was eleven minutes.

THE 'SWELL' IN BOX PACKING.

In (d), Plate 5, a very essential feature of apple packing in boxes is shown. Eastern packers have been so long accustomed to the barrel, a rigid package, that it is difficult for them to conceive that the essential difference between box packing and barrel packing lies in the fact that the box is an elastic package. The secret of rapid and good packing is largely in a recognition of the elasticity of the top and bottom, and, to a very slight extent, of the sides of the box.

In box packing there is every inducement to uniformity in size. For each particular package the skilful packer has many different devices and modifications of this simple layering of the fruit by which he can accommodate the size of the apple to the unvarying dimension of the box. It is understood, of course, that the box remains always the same dimensions, but the apples to be packed are constantly varying in size, and yet the experienced packer has no difficulty in securing an arrangement of the tiers so that after a certain number of tiers are placed in the box, the box is properly filled without the aid of any extraneous packing material, such as paper shavings, excelsior or pulp pads.

Nevertheless, even the most skilful packer requires for the best packing slight difference in the size and shape of the individual apples, differences so slight that they would escape the attention of all but the practised eye. Small as the differences may be between the specimens of any particular package, this difference in size and shape is very important, and is taken advantage of by the packer to secure the swell in the centre of the top and bottom, so noticeable in (d) Plate 5.

This swell serves two purposes. It enables the packer to find a place for the apples slightly larger or smaller than the main run in one or both diameters. There is a careful grading as to size by the eye, so that the smaller specimens are placed at both ends on each tier and the slightly larger one towards the centre. This must be done by selecting the proper-shaped fruit, because it is not desirable to break the plan of any particular tier; that is, if the packing is begun with the apple stems down, it is desirable that the whole tier should be packed stems down. In that case the flatter apples would be placed near the ends of the box, while the apples that were equal in transverse diameter, but not longer through the axis, would be placed towards the middle. Where this is done consistently, it will be found that when the box is packed ready for covering, the apples at the ends of the box project half an inch or more above the box, while at the middle they would rise about an inch and a half above the sides

of the box. This selection and placing of the apples becomes, in the skilful packer, automatic, and he scarcely feels that he is making the selection, so rapidly is it done. Yet if a selection of this sort is not made, there is no possibility of securing a box that will not go slack.

The thin cover is placed upon the top of the apples, and the pressure brought down upon the ends of this to force the cover to the box. The nails and cleats are now driven in, and the box appears as in Plate I.

All fruit will evaporate somewhat after being packed. If the package is rigid, a very slight evaporation will, by lessening the size of the specimens, render the whole package slack or loose. In the case of the barrel there is so much fruit in it and so much pressure is put upon the package that we have some elasticity in the apple itself that prevents slackness for some time. Yet nearly one-third of the fruit sold on the Liverpool markets in barrels is classed as slack to a greater or less extent. In the case of the box with sides, top and bottom rigid, there is not sufficient fruit to get much advantage from the elasticity of the fruit itself, and therefore, such are almost certain to go slack in a very short time; but packed with the bulge on the top and bottom, we take advantage of the elasticity of the wood in the top and bottom, so that as the evaporation and shrinking of the fruit goes on, the elasticity of the top and bottom draws the package together and holds the fruit tight.

We have, then, two good reasons for insisting upon the thin top and bottom, without which we could not give this swell to the finished package. First, that it enables the packing to be done more readily; and second, it enables us to pack a box that will not go slack. Particular attention is drawn to this, because it is so commonly disregarded by eastern packers. Only a few of the packers in the very large exhibit at the Industrial Exhibition at Toronto, in September, 1906, took advantage of this feature of packing. Indeed, the great majority of the exhibitors showed their utter want of appreciation of this very essential element by putting nails through the top and bottom covering into the sides of the box, which would effectually prevent any advantage being taken of the elasticity of the wood.

THE MARKING OF BOX PACKAGES.

In addition to the markings required by the Fruit Marks Act, which are: first, name and address of the packer; second, the kind of fruit; third, its grade, there should be certain other information given more specifically than that required in barrel packing. The grading is so much closer in the case of box packages that it is necessary to distinguish in the matter of size. This is done by stating the number of tiers which the box contains, and the number of apples in the box. In packing, it is usually taken for granted that all apples packed in boxes sent to foreign markets are No. 1 or Fancy fruit, and the size is designated in terms of tiers. In size, then, the apples may vary from a 3-tier to a 5-tier, though smaller than 5-tier would scarcely be No. 1. It is also the practice in the case of coloured apples to designate the intensity of the colour, where they are lighter than normal, by using the letter L. There should also be a number or mark indicating the packer. In addition to this, the exact number of the apples should be placed upon the outside. These marks should be placed uniformly, the best arrangement being that indicated in Fig. 12.

There are, however, no obligatory marks other than those required by the Fruit Marks Act, and any arrangement is legal that may suit the fancy of the packer, but the marking should be as plain as possible. Complicated designs that may be pretty enough as a picture, are seldom satisfactory on commercial packages.

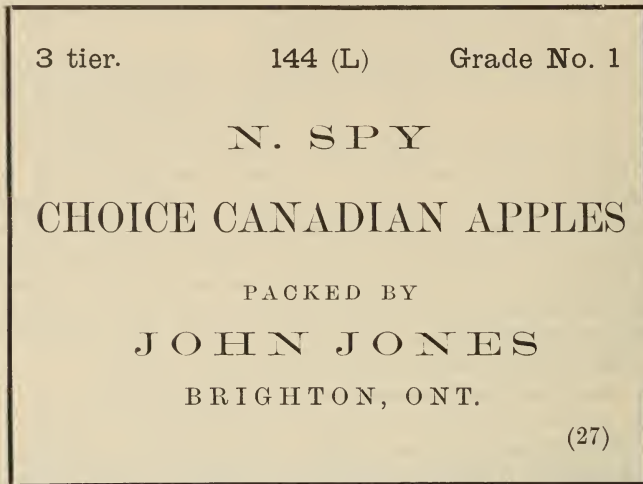


FIG. 12.—Suggestion for Marking Boxes.

APPENDIX I.

The following instructions to box packers give much useful information, illustrating the best practices on the Pacific Coast:—

1. A crew will consist of four packers and one foreman extra.
2. Each packer, before he is permitted to pack for the Apple Growers' Union, must have his name registered at the office of the union and receive a rubber stamp free. He shall be required to stamp each box at the lower left-hand corner, when packed, with his official stamp.
3. Each packer shall be required to put up a first-class pack. If upon any inspection any packer be found guilty of putting up a poor pack, or putting in apples not suitable for the pack being made, he shall bear the expense of repacking such box or boxes for the first two offences. Upon further neglect, he shall be dropped from the list of the Apple Growers' Union packers.
4. Each packer, when a box is packed, shall write with pencil upon the end of the box, in the centre near the top, the number of apples the box contains.
5. Each box of apples shall be packed with about a $\frac{3}{4}$ -inch to 1-inch swell in middle of top and bottom combined, but no box must be packed so high that it will be necessary to cleat the box before nailing on the lid.
6. Each packer shall receive his pay from the grower in cash, or on a written order on the Apple Growers' Union, which will be cashed by the manager on presentation.
7. The charges fixed by the union and agreed to by the packers for packing will be 5 cents per box for all boxes containing 128 apples or less, and 5 cents per box for all boxes packing $4\frac{1}{2}$ tier. All 5-tier apples will be packed at 6 cents. This price shall cover any and all packs ordered by the manager.
8. Each packer will be furnished meals by the grower where he is packing, without charge, but must make necessary arrangements for his bedding.
9. Packers are required only to pack fruit properly wiped and assorted from culls fairly well by the grower before being placed on the packing table, but the packer will be required to make the final culling, which shall not exceed 8 per cent, or 8 boxes in 100. Such boxes as the packer may throw out he will be required to handle with as much care as first-class fruit.
10. Each packer must be supplied with suitable and necessary room at the packing table, which must be properly and substantially made.
11. Each packer shall require the grower to supply him with empty boxes, and have the paper placed in a convenient place.
12. Each packer must set off his box when packed.
13. If the grower is not properly prepared for the packers, the packers will be at liberty to move on, or may charge the grower at the rate of 20 cents an hour for extra time spent in culling and wiping properly. It shall be the duty of each packer to notify the growers of such conditions, when existing, in advance, and should the grower make a protest, the packer will be at liberty to move on and report the matter to the manager, who will endeavour conscientiously to adjust the matter satisfactorily.
14. Packers must be sure to have the exact number of apples in the box as numbered. Foremen are cautioned to watch this. Avoid criticism by following this instruction. We are on the lookout for this sleight-of-hand trick.

APPENDIX II.

The following sections of the Inspection and Sale Act, Chapter 85 of the Revised Statutes, 1906, Part IX, are given for general information:—

319. Unless the context otherwise requires,—

(a) 'closed package' means a box or barrel of which the contents cannot be seen or inspected when such package is closed;

(b) 'fruit' shall not include wild fruit, nor cranberries whether wild or cultivated. 1 E. VII., c. 27, s. 3.

THE MARKING OF FRUIT.

320. Every person who, by himself or through the agency of another person, packs fruit in a closed package, intended for sale, shall cause the package to be marked in a plain and indelible manner in letters not less than half an inch in length, before it is taken from the premises where it is packed,—

(a) with the initials of his christian names, and his full surname and address, or, in the case of a firm or corporation, with the firm or corporate name and address;

(b) with the name of the variety or varieties; and,

(c) with a designation of the grade of fruit, which shall include one of the following four marks, viz.:—Fancy, No. 1, No. 2, No. 3.

2. Such mark may be accompanied by any other designation of grade or brand, if that designation or brand is not inconsistent with, or marked more conspicuously than, the one of the said four marks which is used on the said package. 6 E. VII., c. 15, s. 1.

GRADE DEFINITIONS.

321. No person shall sell, or offer, expose or have in his possession for sale, any fruit packed,—

(a) in a closed package and intended for sale unless such package is marked as required by the provisions of this Part;

(b) in a closed package, upon which package is marked any designation which represents such fruit as of

(i) Fancy quality, unless such fruit consists of well-grown specimens of one variety, sound, of uniform and of at least normal size and of good colour for the variety, of normal shape, free from worm holes, bruises, scab and other defects, and properly packed,

(ii) No. 1 quality, unless such fruit consists of well-grown specimens of one variety, sound, of not less than medium size and of good colour for the variety, of normal shape and not less than ninety per centum free from scab, worm holes, bruises and other defects, and properly packed,

(iii) No. 2 quality, unless such fruit consist of specimens of not less than medium size for the variety and not less than eighty per centum free from worm holes and such other defects as cause material waste, and properly packed;

FACED OR SHOWN SURFACE.

(c) in any package in which the faced or shown surface gives a false representation of the contents of such package and it shall be considered a false representation when more than fifteen per centum of such fruit is substantially smaller in size than, or inferior in grade to, or different in variety from, the faced or shown surface of such package. 1 E. VII., c. 27, ss. 5 and 7 ; 6 E. VII., c. 15, s. 2.

INSPECTORS' BRANDS.

322. Whenever any fruit in any package is found to be so packed so that the faced or shown surface gives a false representation of the contents of the package, any inspector charged with the enforcement of this Part may mark the words *Falsely Packed* in a plain and indelible manner on the package.

2. Whenever any fruit packed in a closed package is found to be falsely marked, the said inspector may efface such false marks and mark the words *'Falsely marked'* in a plain and indelible manner on the package.

3. The inspector shall give notice, by letter or telegram, to the packer whose name is marked on the package, within twenty-four hours after he marks the words *'Falsely packed'* or *'Falsely marked'* on the package. 2 E. VII., c. 10, s. 3; 6 E. VII., c. 15, s. 3.

FRUIT PACKAGES.

325. All apples packed in Canada for export for sale by the barrel in closed barrels shall be packed in good and strong barrels of seasoned wood having dimensions not less than the following, namely:—twenty-six inches and one-fourth between the heads, inside measure, and a head diameter of seventeen inches, and a middle diameter of eighteen inches and one-half, representing as nearly as possible ninety-six quarts.

2. When apples, pears or quinces are sold by the barrel, as a measure of capacity, such barrel shall not be of lesser dimensions than those specified in this section.

3. When apples are packed in Canada for export for sale by the box, they shall be packed in good and strong boxes of seasoned wood, the inside dimensions of which shall not be less than ten inches in depth, eleven inches in width and twenty inches in length, representing as nearly as possible two thousand two hundred cubic inches.

4. When apples are packed in boxes or barrels having trays or fillers wherein it is intended to have a separate compartment for each apple, the provisions of this section as to boxes and barrels shall not apply. 1 E. VII., c. 26, s. 4; 4-5 E. VII., c. 44, ss. 1 and 2.

326. (As amended, 1907.) Every box of berries or currants offered for sale, and every berry box manufactured and offered for sale, in Canada shall be plainly marked on the side of the box, in black letters at least half an inch square, with the word *'Short,'* unless it contains when level-full as nearly exactly as practicable,—

(a) at least four-fifths of a quart; or,

(b) two-fifths of a quart.

2. Every basket of fruit offered for sale in Canada, unless stamped on the side plainly in black letters at least three-quarters of an inch deep and wide, with the word *'Quart'* in full, preceded with the minimum number of quarts, omitting fractions, which the basket will hold when level-full, shall contain, when level-full one or other of the following quantities,—

(a) fifteen quarts or more;

(b) eleven quarts, and be five and three-fourths inches deep perpendicularly, eighteen and three-fourths inches in length and eight inches in width at the top of the basket, sixteen and three-fourths inches in length and six and seven-eighths inches in width at the bottom of the basket, as nearly exactly as practicable, all measurements to be inside of the veneer proper and not to include the top band;

(c) six quarts, and be four and one-half inches deep perpendicularly, fifteen and three-eighths inches in length and seven inches in width at the top of the basket, thirteen and one-half inches in length and five and seven-eighths inches in width at the bottom of the basket, as nearly exactly as practicable, all measurements to be inside of the veneer proper and not to include the top band: Provided that the Governor in Council may by proclamation exempt any province from the operation of this section;

(d) two and two-fifths quarts, as nearly exactly as practicable. 1 E. VII., c. 26, s. 5.

EXAMINATION.

327. Any person charged with the enforcement of this Part may enter upon any premises to make examination of any packages of fruit suspected of being falsely marked or packed in violation of any of the provisions of this Part, whether such packages are on the premises of the owner, or on other premises, or in the possession of a railway or steamship company. 1 E. VII., c. 27, s. 12; 2 E. VII., c. 10, s. 5.

OFFENCES AND PENALTIES.

328. Every person who by himself or through the agency of any other person, in contravention of any of the provisions of this Part, sells, offers, exposes or has in possession for sale any fruit packed,—

(a) in a closed package and intended for sale, unless such package is marked as in this Part required; or,

(b) in a closed package upon which is marked any designation which represents such fruit as of No. 1, or XXX, finest, best or extra good quality, unless such fruit consists of well-grown specimens of one variety, sound, of nearly uniform size, of good colour for the variety, of normal shape and not less than ninety per centum free from scab, worm holes, bruises and other defects, and properly packed; or,

(c) in any package in which the faced or shown surface gives a false representation of the contents of such package;

shall, for each offence, be liable to a fine not exceeding one dollar and not less than twenty-five cents for each package so sold, offered, exposed or had in possession for sale, together with the costs of prosecution, and in default of payment of such fine and costs, shall be liable to imprisonment, with or without hard labour, for a term not exceeding one month, unless such fine and costs and the costs of enforcing the same are sooner paid. 1 E. VII., c. 27, s. 8.

329. Every person who, not being an inspector, wilfully alters, effaces, or obliterates, wholly or partially, or causes to be altered, effaced, or obliterated, any marks on any package which has undergone inspection, shall incur a penalty of forty dollars. 1 E. VII., c. 27, s. 10; 2 E. VII., c. 10, s. 4.

330. Every person who offers or exposes for sale, or who packs for exportation, apples, pears or quinces, by the barrel or box otherwise than in accordance with the foregoing provisions of this Part, shall be liable, on summary conviction, to a penalty of twenty-five cents for each barrel or box of apples, pears or quinces so offered or exposed for sale or packed.

2. Every person who, for export, offers or exposes for sale, or packs, apples by the box otherwise than in accordance with the foregoing provisions of this Part, shall be liable, on summary conviction, to a penalty of twenty-five cents for each box of apples so offered or exposed for sale or packed. 1 E. VII., c. 26, s. 4; 4-5 E. VII., c. 44, ss. 1 and 2.

331. Every person who neglects to comply with any of the provisions of this Part relating to boxes of berries or currants, or berry boxes, or baskets of fruit, or who sells or offers for sale any fruit or berry boxes in contravention of any of the said provisions shall be liable, on summary conviction, to a fine of not less than twenty-five cents for each basket or box so sold or offered for sale. 1 E. VII., c. 26, s. 5.

332. Every person who obstructs any person charged with the enforcement of this Part in entering any premises to make examination of packages of fruit as provided by this Part, or who refused to permit the making of any such examination, shall be liable to a penalty not exceeding five hundred dollars and not less than twenty-

five dollars, together with the costs of prosecution, and in default of payment of such penalty and costs, shall be liable to imprisonment, with or without hard labour, for a term not exceeding six months, unless such penalty and costs and the costs of enforcing the same are sooner paid. 1 E. VII., c. 27, s. 12.

333. The person on whose behalf any fruit is packed, sold, offered or had in possession for sale, contrary to the provisions of the foregoing sections of this Part, shall be *prima facie* liable for the violation of this Part. 1 E. VII., c. 27, s. 11.

