

## UTILIZING SURPLUS FRUITS.

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### BEST DISPOSITION OF FRUIT AN IMPORTANT QUESTION.

How best to dispose of a crop of fruit and prevent waste is a very important matter for the consideration of all practical fruit growers; and it means a great deal more than appears at first thought. When applied to our nation's fruit industry, it presents for consideration the product of large areas, upon which large amounts of money and labor have been expended. Upon the economic and profitable disposition of the product depends the financial success.

It is well known to every culturist that a crop of fruit can not be grown that will be first class in its entirety. There always will be more or less of inferior product in all crops, which should never be placed on the market to compete with the higher grade fruit. Such a use causes a glut in the market, which depresses the price of both grades, and leaves no margin of profit on either; hence, the necessity of providing for the disposition of inferior grades in some other way to the best advantage possible.

Again, markets may at times become glutted to such an extent as to afford no profitable sale for even first-class products in their natural state, thereby resulting in more or less loss, unless they are prepared artificially in some other commercial form.

The proper solution of this question has great weight in its relation to the early ripening products, and especially those of a quickly perishing character and which require immediate consumption or preservation to prevent loss.

It always should be borne in mind by the producer that each bushel of apples, pears, peaches, etc., of the tree fruits, and each quart of blackberries, raspberries, strawberries, etc., of the class known as small fruit, represents a specific cost and outlay of money; hence, every measure of any kind of fruit product allowed to go to waste is a loss of just so much invested capital.

Considering these matters in all their relations to the fruit industry from an economical standpoint, it is readily seen how important it is that provision for the utilization of the entire crop in some form or other should be at hand and ready for immediate use on all fruit plantations, more especially on those remotely situated or otherwise inconvenient to markets.

## PROCESSES FOR SAVING THE CROP.

The several processes which are now in use and regarded as efficient to preserve a crop and put it in commercial form are:

- (1) Sun drying or evaporation with artificial heat.
- (2) Canning.
- (3) Extracting of the juice.

If a plantation is too remote from a market or a preserving factory to justify carriage of the fruit, it will be necessary to work the entire crop at the plantation into concentrated commercial form through the use of one or all of the processes above mentioned.

In some localities all the product of an apple orchard, excepting the first-class fruit (which will generally find a ready sale), may be profitably worked into cider for beverage uses and into vinegar.

The product of peach, pear, and plum orchards, in case the first grade does not find ready sale in its natural state, can be saved from waste through the processes of evaporation and canning.

The product of small fruit plantations, being quickly perishable, requires immediate disposition, either in its natural state or preservation by evaporation and canning to prevent losses. In seasons of great fruitfulness there generally occurs a glutted market, and despite the best efforts of agents and commission houses some large shipments are lost in part or in whole which might be saved by evaporation and canning.

## EVAPORATION.

It is not the intention to go into details in this paper, but to treat the subject in a general way. Evaporation is the most economical and profitable process known for the preservation of fruits, and has almost wholly superseded the old process of sun drying. It is suitable for all kinds of orchard products and some classes of small fruits, and when properly conducted gives to the fruit the best conditions of a healthful food. Compared with sun-dried, the fruit preserved by evaporation will keep better, is more nutritious and digestible, less acid, and commands a better price in market. Evaporated fruit, by its cheapness, is within the reach of all the people, and thus is regarded as the most economical form for general use. The importance and economy of any process which will safely preserve the products of our orchards can hardly be estimated, but the one which will give the best results with the least waste is the one that should receive the greatest attention. The changes that take place and the product resulting from those changes are the same in all slow processes of drying, whether in the sun or by some of the imperfect evaporators that have been in use. In order to secure the best results of evaporation it is necessary to run the temperature as high as possible without injury to the fruit and to keep the air in rapid circulation throughout the chamber. It is under these conditions that the slight chemical

changes in perfectly evaporated fruit take place, the albumen, instead of being slowly dried, will be coagulated, and greatly assist in the preservation of the fruit with all the richness and flavor it possessed in its natural state.

**TREATMENT OF THE FRUIT.**—Apples are generally peeled, cored, and dried by the use of machines adapted to the purpose. They are put upon trays, submitted or not, according to choice, to the fumes of burning sulphur for a very few minutes for the purpose of bleaching, and are then passed to the evaporator, where the temperature is sufficiently high to produce the desired results.

There are some who object to the bleaching process, and perhaps with justification, at least if the treatment is excessive, so that if the consumer consulted the sense of taste rather than the gratification of sight there would be less demand for the bleached product.

Pears and peaches are usually cut in halves and evaporated with or without being peeled, and may or may not be submitted to the bleaching process, according to circumstances. Plums or prunes are treated somewhat differently from most other fruits, and especially is this true in regard to the ripeness of the fruit. For evaporating, it should be allowed to remain on the tree until ripe enough to fall to the ground of its own weight, and some even allow it to remain on the ground some time after it has fallen. It is then gathered and passed over graders, which separate it into several grades or sizes and at the same time remove leaves and all other foreign matter, after which it is placed in bins to remain a short time for further ripening. It is now ready for treatment and curing. There are two methods practiced in curing prunes, about which there is a diversity of opinion. One is what is known as the dipping process, which consists in immersing the fruit for a few minutes in a solution of concentrated lye in the proportion of 1 pound of lye to 12 gallons of water heated to the boiling point and maintained at that point during the dipping. The fruit, having been placed in wire baskets, is dipped in the solution, then taken out and rinsed in pure water to remove all traces of lye and other impurities, placed upon trays, and put into the evaporator. The advocates of this process claim that the fruit dries more quickly, thus causing a saving in expense.

The other method is without dipping in the hot solution. The fruit is taken from the bins, each grade being kept separate, thoroughly rinsed to take away impurities, then spread uniformly on trays, and at once put into the evaporator. Those who advocate this method claim that the cured product is superior in all respects to the dipped fruit and commands a higher price in the market, more than enough to offset the extra expense of drying.

The time of exposure of the fruit in the evaporator must be determined by observation and experience and the degree of heat. From twenty to twenty-four hours is the average time required for drying.

If exposed too long it not only lessens the weight of the product, but injures the quality; if not long enough, the result will be fermentation and mold.

*Grading.*—After the trays are removed from the evaporator the fruit is put into bins, where it is stirred occasionally and allowed to remain until it has passed through the sweating process. In the case of prunes, they are passed over a grader, which separates them into the different grades, as 20's to 30's, 30's to 40's, and so on, according to size, the grades indicating the number of dried prunes to the pound. Evaporated apples are graded according to quality and are sold on the market under three different brands, the best as "Fancy," second as "Choice," and third as "Prime." None but the best quality of white-fleshed varieties should be used for the highest grade, "Fancy."

*Chops.*—After using the main crop of apples for the three grades above mentioned, there still remains a lower grade that can not be worked into the above-mentioned class, but which can be profitably utilized by chopping the whole fruit without peeling or coring into coarse pieces and converting it by evaporation into what is known as "Chops." This has a considerable commercial value for export purposes.

*Cores and skins.*—In the preparation of apples for evaporation the saving of the cores and skins is an additional source of profit accruing from the commercial disposition of the orchard products. This may be accomplished by evaporation under the same treatment given to the solid parts of the fruit. When properly cured they become an article of commercial value in the home and foreign markets, and are used in the manufacture of jellies and wines.

*EVAPORATORS.*—Many different kinds of evaporators are now offered for sale, and upon the right selection of one of the many success greatly depends. Careful investigation of the various machines should be made before purchasing, with a view to finding the one that will produce the best results at the least cost, and of such capacity as shall meet the wants of the purchaser. Great improvements have been made in evaporators since their first introduction; hence, the necessity of a thorough study of the latest and most improved. There are two principles or methods involved in the process of evaporation as now practiced; one is by the use of heated air made to circulate as rapidly as possible throughout the box or room in which the trays of fruit are placed, and the other is by means of steam pipes passing back and forth through the chamber of the evaporator. This latter method is of comparatively recent introduction, and is found to be the most economical and satisfactory where the business is carried on extensively. The heat is more evenly distributed to all parts of the room and the temperature is uniform, avoiding all danger of scorching

the fruit, which is liable to occur in the use of hot air, where some of the trays are in close proximity to the fire. The use of steam will no doubt in time supersede all other methods. But whichever method is used, if the heat is not sufficient or the circulation of air imperfect, the product will not be of the best quality of evaporated fruit, but will instead be more like the sun-dried article, dark colored, tough, with less of the natural flavor, and the juices may have undergone a slow process of fermentation.

#### CANNING.

The canning process is so simple and generally so well understood in its application to fruits and vegetables that it seems hardly necessary to go into extended details on the subject. The fundamental principle involved is that of sterilizing or destroying the microbes of fermentation by the application of heat. Fruits properly preserved in this manner retain much of the natural flavor and richness and are both healthful and nutritious. Almost every household in the rural districts may have at hand ready for use all the necessary canning material for putting up a sufficient supply of fruit for home consumption. With a little experience and study of the methods, every housewife may become a proficient canner, and thus be able to save much of the fruit that otherwise would be lost. Tin cans are much less expensive and surer of success than any other. They may be sealed with wax prepared for the purpose, but cans sealed in this way will only do for home use, as they will not stand transportation. The safe and only method for sealing cans for commercial purposes is by soldering the caps, by which more thorough sterilization may be effected. As heat is the all-important factor in destroying ferment germs, it is essential that these principles be understood in order to insure successful work. The fruit after being prepared substantially the same as for evaporation, and after the addition of a sufficient amount of sugar to sweeten to taste, should be submitted to a boiling heat until thoroughly scalded through, and put into the cans at once, filling them as full as possible and sealing immediately, making them absolutely air-tight.

In canning, a lower degree than 212° F. is generally unreliable, and as this degree applied only for a sufficient length of time does not, as a rule, unduly cook ordinary fruit, it may be adopted as a safe standard.

All classes of fruit may be preserved by this process, but it is especially satisfactory for such fruits as peaches, pears, and all kinds of small fruits.

It is therefore a valuable aid in the absence of a convenient market in saving the surplus of a crop or any portion of it which may become overripe.

## EXTRACTING THE JUICE.

This might properly be termed the clearing-up process as generally followed. All culls and tailings of the crop are dumped in the stock to be worked up for cider and vinegar, as it is not often necessary to work up by this process any of the first and second grades to save them from waste. A market can generally be found near by for all firm, first-class fruit, and canneries and evaporators are common at every town throughout the rural districts, which offer a market for all second-grade fruit; hence, it is the third grade, composed of damaged and refuse fruit, that this process saves to the grower.

**CIDER.**—Cider, for a beverage, to be healthful and palatable, should be made from clean, sound fruit, and of varieties that contain the essential constituents for making a first-class article.

All worm-infested, half-rotten, and immature fruit should be thrown out to be worked with the stock for vinegar, and the manufacturer should bear in mind that his goods should be as wholesome as well as a palatable beverage. Neatness and care in this line are as important to the consumer as in any other manufactured pure food.

The process consists in grinding or grating the fruit sufficiently fine to yield up its juice readily under proper pressure.

There are various kinds of machinery manufactured for use in cider making, but one that will extract the juice most thoroughly is the one that will be most profitable.

In selecting machinery the efficiency of a press is as important (if not more important) as that of a grater, for, no matter how thoroughly the pulp may be reduced, if the press power be insufficient more or less waste will occur in extracting the juice.

*Fermentation.*—It is a well-known fact that fermentation is due to the growth of certain fungous yeast plants in the fermenting fluid, and it is from this knowledge that an explanation is afforded for many of the difficulties that arise in the process and which point out the means best adapted to meet them successfully. The condition most favorable to the rapid growth of these plants, such as juices rich in saccharine matter and a warm temperature, produce a quick, active fermentation, whereas the watery juices deficient in glucose cause them to grow so weakly that a slow fermentation sets in and creates great difficulty at first to increase its activity and afterwards to arrest it.

The fermentation of cider, as described by Downing, is conducted as follows: The newly filled casks, with their bungs out, are placed either in a cool cellar or in the open air, and as the scum works out the barrel is kept filled with some of the same must reserved for this purpose. In a few days the rising will commonly cease, which indicates that the first fermentation is over. The bung is now closed, and in two or three days driven in firmly, leaving a small venthole

open, which should also be stopped a few days later. The clear cider is now racked off by siphon into a clean cask, and if in a few days it is found to remain quiet, a gill of finely powdered charcoal is added to each barrel, when it is closed and left until spring. In March it is again racked off, and if the cider is not quite bright, three-quarters of an ounce of isinglass, previously dissolved, is added to each barrel. In a few days it will be fit for bottling, and this may be done at any time up to May.

**ORCHARD BRANDY.**—Another product of the orchard may readily be obtained from the refuse of apples, when it is thought desirable to do so, just as it is from that of grapes after wine making. The pomace from the press is added to the lees in the first racking, with a sufficiency of water, and refermented. As soon as the active fermentation is over and the lees settle to the bottom, the spirits may at once be distilled from the liquor, or it may be distilled with better results from the cider after the first fermentation of the must. In either case the distillation should be effected by means of the water bath, or the brandy will have a rancid taste. The brandy will vary in flavor and strength according to the richness of the must and the care with which it has been made.

**VINEGAR.**—The manufacture of vinegar does not in its first stages exact the same care in treatment as that of cider. The process of grinding and pressing is the same. The juice is placed in vats or casks and exposed to the action of the air, which causes it to undergo vinous and then acetic fermentation. After remaining in this condition for a sufficient length of time it should be drawn off into clean casks, care being taken to prevent the sediment from entering with the juice. In these new vessels it must still be exposed to the action of the air until acidified, when it should be again drawn off into clean casks, the same care being observed regarding the sediment. In this second set of new vessels it must still be exposed to the action of the air until thoroughly acidified, when it should be again drawn off and closed up tight to prevent putrefactive fermentation.

Vinegar, pure and wholesome, is generally made from apples and grape juice, although an equally fine article may be made from refuse pears, cherries, and other fruits.

**FRUIT JUICES, UNFERMENTED WINE, AND FRUIT SIRUPS.**—These may be put up and preserved by the same process as described for canning fruits, but glass jars or bottles are preferable to tin for this purpose. For the best results, such fruit juices should be carefully expressed, strained, and kept quiet until well settled, and only the decanted pure juice canned or bottled. All such preserved fruit juices make delicious, wholesome, and nourishing nonalcoholic summer drinks. They have an appetizing value in cookery. The demand for such goods is constantly increasing.

**JELLIES.**—This is one of the most tasty and attractive forms in which fruit is put upon the market. Jelly is made from pure fruit juice and sugar in equal proportions. Apples, quinces, apricots, plums, grapes, strawberries, etc., may be used in its manufacture. Fruits for jellies should not be overripe, and should contain a certain amount of pectic acid, a gelatinous substance soluble in fruit juice, but which, when combined with sugar, exposed to heat for a certain time and then cooled, causes the juice to coagulate, thus forming jelly.

There are many jelly manufactories in the United States at present, and the annual output of the jelly trade has been estimated at 20,000,000 pounds. The business is a profitable one, and the demand for the product is annually increasing, its low price enabling all to indulge in it. The larger part of the jelly now made is from the apple. Much apple jelly flavored with other fruit flavorings is sold for the jelly of fruits less disposed to form jelly.

#### UTILIZING THE FALLEN PRODUCT.

Through the attacks of insects, which become numerous in some orchards, and through violent windstorms and severe droughts, a portion of the product will prematurely fall and be wasted unless means are used to save it.

This fallen fruit is unfit for any purpose except for swine food, and it is therefore advisable to turn hogs into the orchard to forage upon it, thus converting it into a food for an animal having a commercial value, and at the same time causing the destruction of the infesting insect larvæ and preventing the future increase and spread of such damaging agents.

Thus, it will be seen that there is no necessity for any waste occurring in any portion of the product of an orchard under economical management, as all parts of the fruit may be profitably saved by the several methods presented.

What has been said has been more especially in regard to saving the product of the smaller or family orchard, but the principles involved are the same whether applied to large or small establishments, and the means may be provided according to the necessity of the larger or smaller operation.