

have corrugated bottoms, exposing three feet or more of surface to the fire to every foot of open surface. The one we use for 1,150 trees is 10 feet long, 42 inches wide, and has 120 square feet of heating surface. The boiling is very rapid. The sap runs into the evaporator through a self-feeding regulator, letting on a larger stream as the boiling is rapid, and shutting off as the fire cools down, closing tight when the boiling stops. It would be very difficult to feed through a faucet, and very unsafe, as we have only one-quarter of an inch of sap above the corrugators. The syrup runs from the back compartment in a continual stream. This is settled and then poured into a sugaring off pan made of bright tin, and set on a tight arch to be finished to syrup or sugar. Milk is never used for cleansing, as it injures the color of the syrup. The whites of four eggs to one hundred pounds beaten to a froth, and mixed with a quart of cold sap, will raise the most complete scum of anything, and will leave the syrup clear. A drop or two of sweet cream is put in occasionally to prevent boiling over; it is also used to prevent the sap from foaming in the evaporator, so it will boil faster. After skimming, the syrup is boiled quickly until 220 degrees of heat is reached; it is then as heavy as will keep well. If lighter weight syrup is desired, 216 to 218 degrees will suit the case. This is done by holding the thermometer in the boiling syrup. If sugar is desired, boiling is continued, but more slowly, until 212 to 216 degrees is reached—the latter figure is very hard, for cake sugar; it is then removed from the arch and allowed to cool. After the grain forms it is moved gently with a paddle (stirring is avoided as much as possible, as it makes it fine grain) until of the consistency of mortar, when it is put into square moulds of one or two pounds each; twenty cubic inches (or a cake 2 in. x 2 in. x 5 in.) makes a pound.

There are various improvements going on all the time. The most improved spile only requires three-eighths of an inch tap. The covered tin bucket is fast coming into use. Some of the latest made evaporators have condensers, so the steam is run off as water. The sugar house is usually built near a side hill, so that the sap may be run from the gathering tub down to the tank. It is run through a strainer the same as milk at a cheesefactory. The tank is made box shape, with a strong frame, and lined with tin or some such material, to hold several hundred gallons, from which it flows to the evaporator. Cleanliness is a most important factor in making good sugar. The quicker the sap can be gathered and boiled the lighter color the sugar and the better flavor.

The sugar season is of great interest, and nothing excites so much as a big run; there is no controlling it. Sometimes there are several days between the runs. The product is from two to four pounds per tree, according to the season.

[Mr. Fowler sent us two samples of sugar, one almost as light as the best granulated sugar and the other about the color of good coffee sugar.]

GARDEN AND ORCHARD.

Horticultural Notes.

BY W. W. HILBORN.

Arbor Vitea (*Pyramidalis*) makes the best evergreen hedge for the lawn.

If there is a better early potato than Early Sunrise, I would like to see it.

Sow a few early peas as soon as the soil will do to work—of such early sorts as Alaska, and First and Best, etc.

If you have not tried any of the new dwarf French cannas, try Madam Crozy. It is the best one yet introduced, brilliant scarlet, each petal edged with gold; it will bloom all summer—it is as beauty.

Marguerite Carnation will bloom in about four months from the time the seeds are sown, and will continue to bloom the balance of the season; and if taken up before frost injures them will bloom all winter in the house or conservatory. This is one of the best new flowers offered by seedsmen.

Hydrangea Paniculata Grandiflora is, perhaps, the best fall blooming shrub for the lawn. It should be cut back nearly to the ground every spring, as the bloom comes on the ends of the present year's growth, and when these start out from the base of the plant they are much stronger, hence give larger bloom—often a foot in length.

If you wish to grow a few peaches for your own use, do not plant Crawford's; they are not so hardy in the blossom buds as many other varieties. Try Early Barnard, Hill's Chili, Wager, Lemon and Smock Free. Well drained sandy loam suits them best. A northern slope should be selected, if possible.

Burpee's Bush Lima Bean is truly a bush Lima, very productive, yielding a large crop of fine quality, but it is too late for most parts of Canada, as it will ripen only a small portion before frost catches them.

Grow a few early vegetables by sowing a few seeds in a box that you can cover with a pane of glass—a box ten by twelve inches will hold enough for the first sowing of celery, tomatoes, lettuce and cabbage. The box should be three inches deep, with two inches of any good garden loam, in which the seeds should be sown in drills; water, and cover with the glass and keep warm. The glass will keep the soil from drying out, and also retain heat. Transplant when the second pair of leaves have nicely started. It is a mistake to let them get too large before transplanting. Boxes of any con-

venient length and width may be used to set the young plants into. I use boxes twelve by twenty-four inches, and two and a-half deep. These can be moved about as required. A cold frame can easily be made by nailing a few boards together, and place on the south side of the house, and cover with any sash that may be at hand. A little experience will enable you to have vegetables in this way two or three weeks earlier than your neighbors who wait until everything can be planted in the open ground.

Gladiolus should be more extensively grown than they are at present. There are so many fine varieties to be had now in all shades of color, from white to dark red and yellow. Plant about three or four inches deep in any good garden loam, eight or ten inches apart, when the weather becomes warm. No other bulb will give better satisfaction, they are so readily grown and easily kept over for planting again the following spring.

Pruning may be done this month on apple, pear, plum, cherry, grapes, currants and gooseberries. Red and black raspberries and blackberries are better left until the new growth begins to push forth. You can then tell just how far to cut back, and if cut before freezing weather is past the canes are injured.

Currants and gooseberries should be grown on the "renewal" plan. Cut out old wood as fast as it loses vigor, and allow new wood to replace a small portion of the old every year; shorten back about one-half in length of the new growth, and cut out all weak shoots—remember always that the fruit is borne on wood two years old. Grapes that were left over last fall may be pruned now before the sap begins to flow freely.

Planting Strawberries.—Anybody can plant a strawberry plant so it will grow for a time if the weather is favorable; but comparatively few know just how it should be done to succeed in an unfavorable season, hence the cause of so many failures in planting that fruit. Perhaps no other plants require such careful attention in setting as the strawberry to obtain the best results, although any method is generally supposed to answer as they appear to grow so readily, and they will grow for a time with almost any way of planting; but later on in the season, when the weather gets hot and dry, badly set plants begin to fail. They do not make any headway, but either gradually die or stand still until showery weather comes in the autumn, which usually occurs so late that a good stand of plants is not produced, hence the crop is not a profitable one. Failure can usually be traced to planting too deep, not deep enough, or not spreading the roots and packing the soil sufficiently among them. Another cause of failure is letting the wind and sun dry up the plants when planting. To prevent this, sprinkle them with water, and scatter a little soil over them in the box or basket that you plant from. The plants will be injured in a very few minutes on a bright, windy day without this precaution. My method of planting is as follows: After the land has been thoroughly prepared, mark off in rows with corn marker four feet apart. Take pains to have the rows straight; it adds to the appearance of the plot, and time is saved in cultivation. Trim off all dead leaves and old runners from the plants. Shorten the roots to three or four inches. Keep them moist and where the wind cannot reach them while out of the ground. When planting, make a hole deep enough to admit the roots without doubling them up. Take the plant in the left hand, place the crown on a level with the surrounding soil, spread the roots out fan shaped, fill in the soil, working it in among them, and press so firmly that by giving a quick jerk on a leaf it will break off without moving the plant.

Best varieties are: Crescent Seedling, Bubach, Wilson, Haverland and Warfield No. 2. Of the newer sorts: Beder Wood, Great Pacific, Lovett's Early (not early), Saunders, Woolverton, Advocate, Middlefield and Parker Earle.

Experiments in Root Grafting.

JOHN CRAIG, EXPERIMENTAL FARM, OTTAWA.

It would therefore seem that for the milder portions of Quebec and Ontario, where root-killing is unknown, budded trees (especially as we have no reliable data bearing upon the relative length of life of budded and grafted stock) will give the most satisfactory results. But for the colder portions of our country, the piece root would seem to serve an almost indispensable purpose, where extreme hardiness is desired, and when a variety of known hardiness is used, placed upon the piece root, which acts as a temporary support till roots of its own are developed. We thus obtain a tree upon its own roots, the most desirable of all kinds, and without doubt the one that will best withstand the vicissitudes of our climate. It has been my experience that good apple trees, for all situations, can be grown by using only the first and second sections of the root, which should not be less than 31 inches in length and the scion between 5 and 6 inches. These, when properly joined together, will, under ordinary conditions, make a growth which, if not equal to a budded tree the first year, will generally be quite satisfactory.

The pear is almost entirely propagated by budding. There are a few nursery firms in the Eastern States who, to demonstrate conclusively, if possible, which is the best method of propagating the apple for northern sections, began last year a series of experiments in root-grafting. In this experiment whole roots and sections of roots are used and kept apart for the purpose of comparison.

DAIRY.

The Babcock Tester for the Cheese Factory.

BY PROF. ROBERTSON, DAIRY COMMISSIONER.

The effect of paying a man who sends milk to a cheese factory solely for the number of pounds of milk which comes in his can has been to create a feeling of suspicion in the minds of farmers regarding the honesty of their neighbors and the fairness of the management of the factory. You can never make a foundation for a business so deep that the superstructure will not be threatened with disaster when such a feeling is allowed to prevail. It will never do to pay A for more than comes in his can, nor B for less than comes in his. If you can devise some method which will make a fair division, you will eliminate suspicion. We have never found it needful to argue with farmers as to the advantage of accepting and doing the right thing, if we could only show them *how* to do it and how it should be done. As soon as you can show the farmer how to pay for milk according to its value at cheese factories and creameries, he will go with you. In making butter, it is very easy to frame an accurate basis for distributing the proceeds. The quantity of butterfat bears a somewhat constant relation to the quantity of butter which can be made from the milk. If you add to the butterfat about one-sixth of something else which sells at the same price as the butterfat (although intrinsically not really worth as much), what is the result? In every six parts, five will be butterfat and one part of something inferior. Yet all these parts are selling at the price of the butterfat. That sixth or added part is largely water, yet owing to its association with excellent butterfat it will bring an equal value with butterfat. You have in cheese three main constituents coming from milk—fat, casein and water. Now a certain part of the water in milk has a value. I can sell some of the water at 10 cents a pound, if I receive that price for my cheese. Water, like other things, gets acquired and accredited value by the company it is found in. For instance, I had a cheesemaker once, who was an awfully untidy fellow, and did not make fine cheese regularly. I bore with his infirmities, and now he is a good cheesemaker. The last time I visited his factory it was as clean as his wife's parlor. He got married to a good, smart, tidy woman, and since that time, from being much in her good company, he has been improved in like manner. You will never find a consumer of cheese finding fault with the water in cheese, if it is in good company. If you have too much water for the fat or for the casein, the cheese will go off flavor. But if the water is in its right place and proportion you will have a well flavored and a merchantable cheese. The casein alone will not determine the value of the milk for cheesemaking, neither will the fat; the water must be there in the proper amount. It is only when there is the proper proportion of these three, that the fat is a sufficient standard for valuation. We had cheese made from milk containing an average of 3.86 per cent. of fat. There was one large vat with two partitions put in, making three compartments. The milk from all the patrons was tested and put into three classes: rich, medium and poor. We made cheese from these three. The average for the rich milk was 3.86. In the medium compartment was put milk averaging 3.6, and in the third compartment was placed the poor milk which averaged 3.45. These are the averages for nine days in each case. That is not a wide difference, but it was as wide as we could get and fill the compartments. The process of manufacture was uniform in each case. The richest milk in the last half of July and the first week in August required an average 10.38 pounds of milk to the pound of cheese. (The average of the Province of Ontario for that season of the year was over 11 pounds with cheese made in the same way.) The average of the middle compartments was 10.81 pounds of milk to a pound of cheese, and the average of the third lot was 11.21 pounds. In milk containing between three and four per cent. of fat the gain in the percentage of fat becomes more important, as in this case every two tenths of a per cent. of fat would give about three-tenths of a pound of cheese additional per 100 pounds of milk. The average yield of cured cheese per 100 pounds of milk is indicated in the following table:

Average per cent. of fat in milk.	3.86	3.60	3.45
Yield of cheese per 100 lbs. of milk.	9.53 lbs.	9.22 lbs.	8.92 lbs.

It appears that the richer the milk is in fat, up to four per cent., the larger is the quantity of water which can be retained with the other constituents of cheese without deterioration to its quality. In ordinary cheesemaking, where you have milk containing four per cent. of fat, you have reached the maximum limit, and beyond that you cannot increase the per cent. of water that will be retained in the cheese, and do not increase the value of the cheese per pound.

I think that the addition of a per cent. of fat to the milk between three and four per cent. will add 2 of a cent per pound to the value of the cheese. The butterfat in some measure adds to the value of the other constituents of milk. I believe there have been some prosecutions of honest men. I would rather that fifty guilty men should go unpunished, than wound an innocent man who was honest. It is not fair to say, "We will settle with you for twenty-five dollars, or we'll prosecute you." Some men will say, "I am innocent and will fight you;" but others again will say, "I am innocent, but there is my wife and family, and if I do not settle, although I am innocent, the charge will get out and it may stain or ruin my reputation." Pay