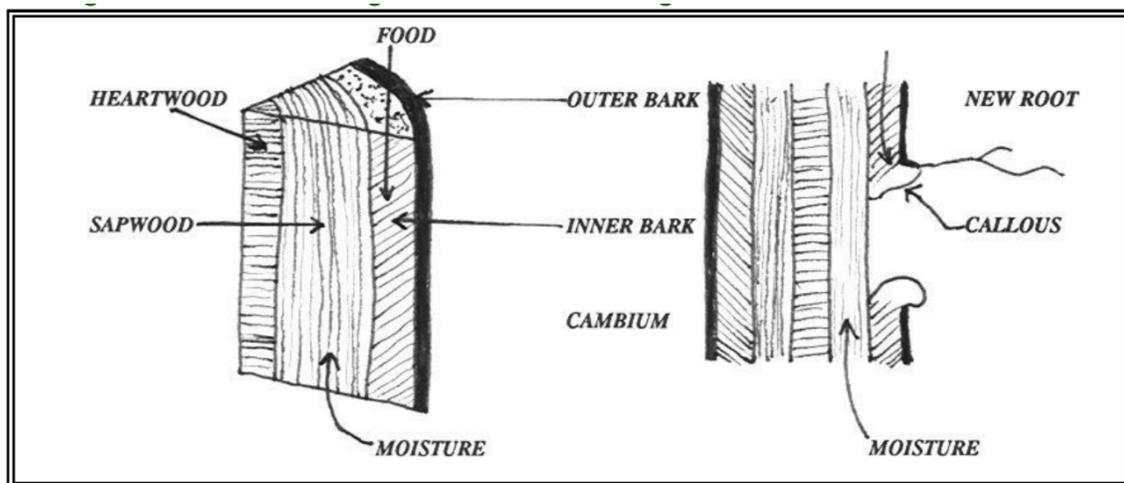


LAYERING*

By David DeGroot

There are various methods of layering or causing roots to form on a trunk or branch while it is still attached to the parent plant. All methods involve injuring the inner bark providing a medium at the point of injury into which new roots may grow.

The reason why layerings may succeed where cuttings fail is that cuttings depend upon their ability to draw moisture from their planting medium, whereas layers receive moisture directly from the parent plant. Layering takes advantage of tree physiology in the following way: moisture and nutrients flow upward from the roots to the leaves through living tissue in the sapwood. Some portion of this sapwood must remain intact for the layer to succeed. The water and nutrients are converted to food in the leaves, and this food moves down through the inner bark. The food is either used for growth by the cambium or is stored in the root system. It is this downward flow of food that must be interrupted in order to force new root growth.

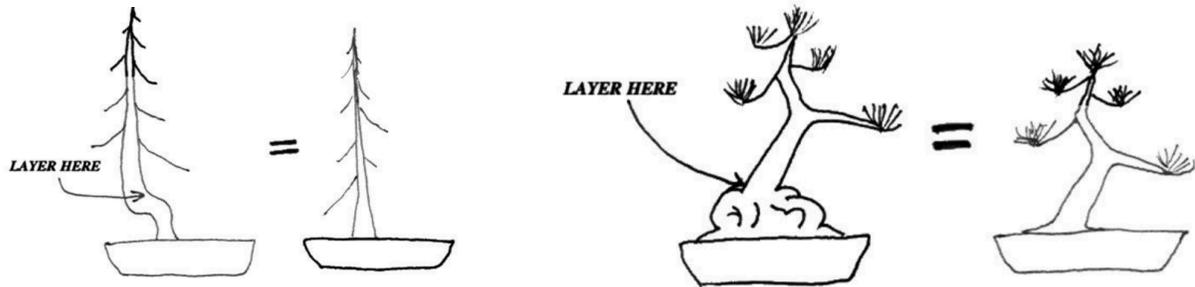


There are several types of layering. Some, such as mound layering and tip layering, are used primarily for propagation, but two types, ground layering and air layering, are used by bonsai growers to effect design changes. With either type layering the normal size of the material used ranges from about the size of a pencil to more than an inch.

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GROUND LAYERING

Purposes: to be used when an otherwise good tree has a serious flaw such as an ugly curve at the base of the trunk or poor rootage.



Time of year: Ground layering should be done in the spring and left for at least a year. Even deciduous material should have a year's development before separation from the old root system, as the new roots of ground layers are usually more traumatized at repotting time than are the new roots of air-layers.

Type of wound: A **diagonal cut** is used for smaller material. The cut is usually on a downward slant and nearly to the center. The cut must be propped open with a bit of wood, stone, or shell, so that it cannot callous over.



Advantage: This type of wound is quite safe... there is little likelihood of losing the layer.

Disadvantages: This cut promotes one-sided root development, at least in the first years. Also, there is at least an even chance that the part to be layered will not put out roots, but merely transfer the flow of food to the undamaged side of the trunk. Conifers, in particular, are prone to do this.

Procedure: Locate the spot where you want the new root system. The new roots will emerge above the point at which you interrupt the inner bark, so make the wound $\frac{1}{2}$ to 1 inch below the point at which you want the roots to form. If there is a node or dormant bud nearby, keep it above the wound as roots will be quick to form there.

Make the desired wound. The diagonal cut must be propped open. Cuts should be dusted with rooting hormone. The tree must be placed in a deep container so that sufficient rooting medium can be added to bury the wound two to three inches deep.

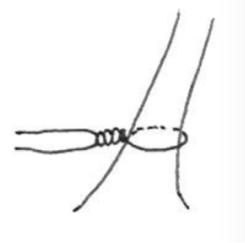
The rooting medium should be pure sand, half sand/half peat, or finely sifted hadite.

All trees to be ground layered must be firmly staked so tree movement does not damage new roots. Give normal care after layering. The following spring, if new roots are visible, give a hard top pruning, then cut just below the new root system and follow normal repotting procedure.

GIRDLING WIRE A wire is wrapped about the trunk or branch and twisted until it bites into the bark. If the wire is not tight enough, its effectiveness will be delayed until the trunk swells.

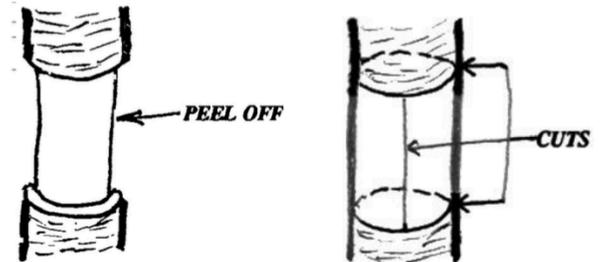
Advantage: Very simple and reasonably safe. This is the girdling method most used for layering conifers.

Disadvantage: Trees are usually slower to form roots with this method than with the others.



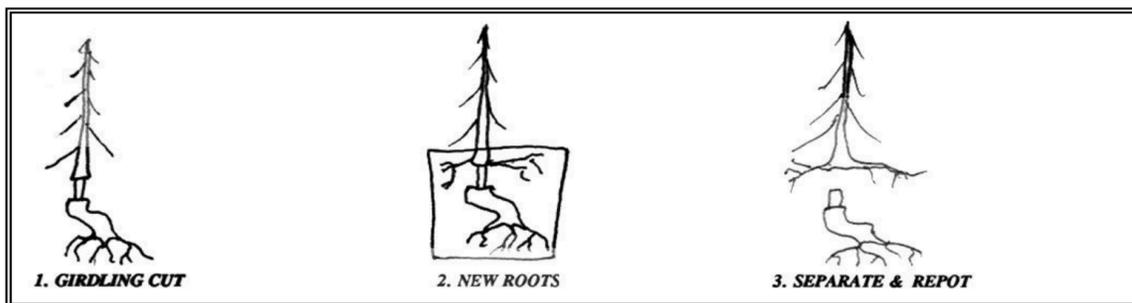
BARK REMOVAL

Two cuts are made down to the sapwood, completely around the trunk. The distance between cuts should be about equal to the diameter of larger material and at least twice the diameter of smaller material. This is important, for if the cuts are too close together, callous tissue may simply close the wound, and the layer will not work. Make a vertical cut between the two girdling cuts and peel off the strip of bark.



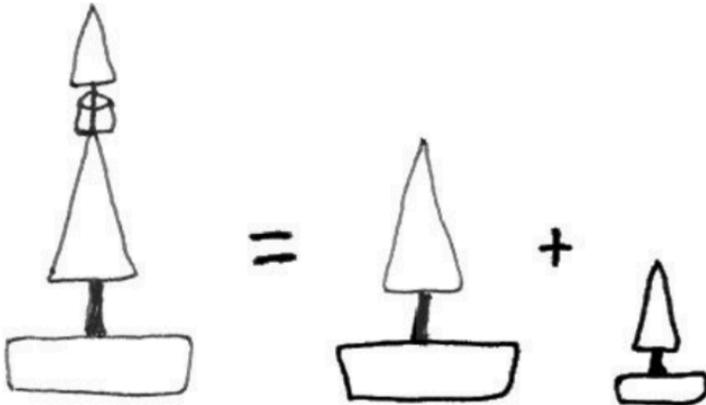
Advantages: Effective, produces fast results.

Disadvantage: A little more risky than other methods, and slightly more complicated to do.

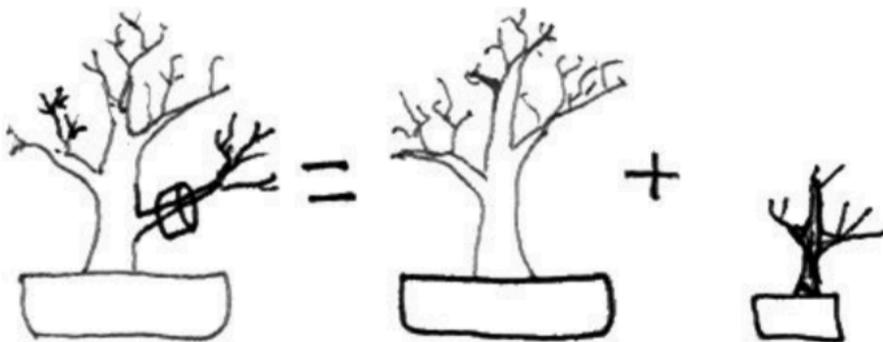


AIR-LAYERING

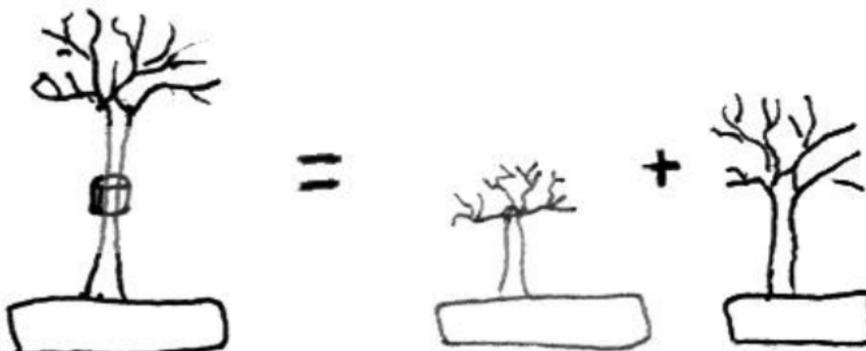
Purposes: For obtaining a new tree from the apex of a large tree:



or from a well-shaped branch of a large tree:



or for reducing the height of a too leggy tree:



Time of Year: Usually springtime. Some growers air-layer even before budbreak to start a callous forming as early as possible, but most prefer to wait until the tree has leafed out. September air-layering is sometimes used on deciduous trees and broadleaf evergreens for removal the following spring, but unless protection is given to such trees, there is danger of winter cold damage to the new roots. Conifers are sometimes air-layered in fall for removal a year from the following spring, but these should be given winter protection for the first year also.

Types of Wound: Same as for ground layering.

Procedure: Locate the position of the new root system and make the desired wound. A diagonal cut can be kept open with a bit of damp sphagnum moss. Dust cuts with rooting hormone. Wet some sphagnum moss and squeeze it in your hands until it is moist, but not wet. Wrap this handful of moss around the wounded area and secure with a few winds of string. The moss should be in close contact with any cut tissue. Take a piece of clear plastic film (so the roots will be visible through it), and wrap the bundle of moss, folding the seam over two or three times. Secure the plastic wrap at the top and bottom with twist ties or electrical tape.

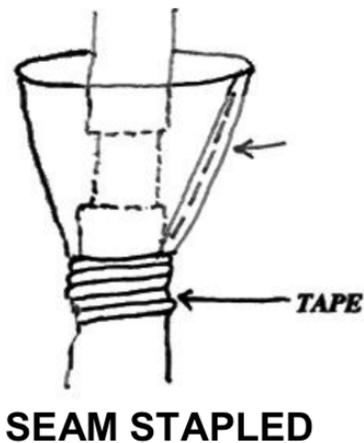
Deciduous air-layers, which will be separated in a few months' time, are usually taped securely top and bottom to keep them moisture proof and then not disturbed.

Air-layers which must be kept for many months, as with conifers, use twist ties at the top, so they can be opened for watering. At the bottom use a twist tie or tape with a few small cuts in the plastic so that the excess water can flow out when the moss is moistened. Excess water can be fatal to an air-layer, and the top is secured as much to keep rain out as to keep moisture in.

After the plastic is secured, aluminum foil can be wrapped about the whole to keep it from getting overheated in the sunlight.



There is another method of air-layering using moist vermiculite instead of sphagnum moss, and an open funnel of plastic instead of the wrapper. Japanese nurserymen have found this highly effective, but unless you can give it daily attention, drying out and subsequent failure is a real problem.



**FILL WITH
VERMICULITE
AND WATER
FROM ABOVE**

Sphagnum moss holds together quite well when the air-layer is removed, but if vermiculite, perlite, or some other loose material is used as a rooting medium, a couple layers of nylon hairnet or similar open, rot-proof material should be placed inside the plastic wrap. The net will help keep the rootball intact when the air-layer is transplanted.



Air-layers using a diagonal cut should have one or two splints bound to the branch so that it does not snap in the wind. Branches that are girdled need no bracing. When several good sized roots are visible inside the plastic wrap, the air-layer is ready for removal. Air-layers should be removed with shears, if possible, to avoid jarring the rootball. Remember that top pruning at the time of separation is very important, and give protection from sun and wind for three to four weeks afterward.