The 9 April 2005 meeting was a workshop on propagating. Dick Punnett talked about cuttings and grafting, Don LaFond about starting plants from seed, Tony Reznicek discussed his method of growing some difficult plants with tiny seeds. Because this information may be of general interest over a period of time and to many members, and our Secretary, Laura Serowicz's notes were so comprehensive, it seemed reasonable to make the notes for this lecture into a four page insert that can be kept for reference – Editor

PROPAGATING BY CUTTINGS AND GRAFTING

by
Richard W. Punnett

CUTTINGS: Generally most things are rooted when they are in a soft or semi-soft condition. For soft cuttings, you want to take the current years growth, and cut off with scissors, then take off the bottom layer of leaves – you must have a little bit of bare stem on the bottom of the cutting. You don't want to take a stem that has flower buds unless you absolutely have to, and if that is the case you should cut off the flower bud. For most cuttings you want to remove any leaves that will be into the medium, only leaves that are above the medium should stay on the stem. Only for Spruce cuttings can you root with the needles on the stem. In a nearing frame, if the cutting doesn't root quickly enough (3-4 weeks for perennials, 6-8 weeks or more for woody material) they tend to rot because they are so heavily shaded and they don't get the roots out quickly enough to maintain the cutting. For mature wood cuttings you want a stem with a number of nodes and cut below a node the same distance as the thickness of the stem. For material that has a lot of leaves you can trim the leaves in half so that you can have the cuttings closer together and it helps reduce water loss in the cutting. For rhododendron cuttings Dick also wounds the stem cutting by taking a ½" sliver of wood off at the cut. The preferred temperature for the soil is 78°F.

WHEN TO TAKE CUTTINGS:

Rhododendrons (lepidote = scaly leaved) and "Evergreen" Azaleas July 1 to July 15 preferred (or September 15 to October 15). Cut the current year's growth.

Deciduous Woody Species, Alpines, and Perennials Spring and early summer. Cut the current year's growth only. Daphnes (easy; 5-9 weeks; July-Aug outdoors and Oct-Nov in greenhouse) *Styrax* and *Stewartia* (easy; 6-8 weeks) Gentians (easy; late June-early July) all Composites and *Deinanthe* (easy) **Exceptions:** *Silene* and *Artemisia* (better in sand bed than in Nearing Frame) *Hamamelis* (variable to difficult in Nearing Frame) *Eriogonum* (mostly difficult)

Rhododendrons (large-leaved) September 15 to October 30 (occasionally November). Cut the current year's growth.

Deciduous Azaleas (these are easy) June or earlier. Cut the current season's growth while still soft, and after the cuttings set roots, transplant to force into growth, but protect from the first year's winter.

Conifers (scale-leaved are easier than needle-leaved) Generally spring to fall [Dwarf *Chamaecyparis* are best taken in early spring; most *Tsuga* are best taken in late summer to early fall]. You usually cut the current year's growth, but with most dwarf to extreme dwarf varieties the 2 yr old wood can be used.

HORMONES: Generally 1500 ppm each of IBA and NAA but Magnolias need 4500 ppm of each. There are two types of hormones; powders and liquids. Powders come in different strengths, but Dick likes the liquids much better because they have the advantage that you can mix them to whatever strength you want and just dip the cutting. The disadvantage is that you can't keep them for a long period of time – a couple weeks at the most, whereas the powders, kept dry, will keep for a number of years without losing potency. There is also a liquid form which uses alcohol as the base and Dick does not like this as the alcohol tends to burn the stem. The liquid kind he uses is a combination of IBA and NAA, generally at 1500 parts per million of each. Liquid hormones are available at chemical supply places or via mail order. Rootone powder is available at hardware or garden supply stores, but it only comes in one strength; Hormex powder comes in a wide variety of strengths. Too strong a hormone will kill the cutting or a huge callus will form at the point where the stem was dipped to and never root. Rootone will work on most things and if after a considerable period of time your cutting has not rooted (or rotted) try using a stronger hormone.

GRAFTING: When you are grafting you have to graft onto a compatible root stock which generally means using scions and rootstock from the same genus, i.e. a maple onto a maple, etc. Conifers have a few exceptional needs – 2-needle pine scions must be grafted to 2-needle pine rootstocks, but 1-, 3-, 5-needle pines can all be grafted to 5-needle pine rootstocks. Almost all Spruce can be grafted onto Norway Spruce. Deciduous material is easier to graft than evergreens, and is more forgiving on timing and temperature. Start with the scions and the rootstocks in dormant states – either late summer when they've shut down or mid-winter

before growth starts. The ideal time to do grafting is November-January (with December the best month). To make a graft you cut a slot into the bark on the rootstock angled slightly deeper in as you cut down. Cut the scion from the source on a 45 degree angle through the stem, clean off the bottom needles on conifers, and on one side make a ¾-½ inch cut very shallowly in one continuous stroke. Ideally you want the scion to be the same thickness as the stock plant so that when you insert the scion into the slot the cambium layers line up on both sides. When you are using a scion that is a lot smaller, you have to make sure that the cambium layers on the scion and stock line up on one side. To keep them there he uses parafilm strips. The parafilm stretches nicely and is a wax-like material so you don't need to wax the graft as you would using a rubber band or budding strip to keep out the air. If you are not using parafilm you must seal the graft with wax but be careful that the wax is not too hot, or it will burn the tissues. Grafting in the middle of winter in a cool greenhouse (ideally 35-40°F for a month) the stock plant will continue to grow slowly, but until the graft has 'taken' the scion should remain dormant, and then as it gets warmer in the spring the grafted scion will be ready to start growing. You can also do grafting at home outside in late winter/early spring, avoiding the really hot or cold weather. You can also do it in mid- to late- August as long as the scion is dormant and hardened off, but you must keep it extremely humid until it knits together, and that is about a 6 week period. Once the scion is growing you cut back the stock plant stem by degrees as the new stock grows, ultimately you will cut it back to where it is grafted.

AIR-LAYERING: A rather slow method you can use for woody material is air-layering, which involves cutting a ring around a stem you want to root (about ½" wide cut) and removing the ring of bark down to the cambium layer. You then put some hormone on the cut, pack damp sphagnum moss around the wound, and wrap plastic sheeting around it. When you see roots growing inside the plastic in the moss, you can separate it from the original plant and plant it. Dick has used this method with lilacs and has heard it works quite well on tree peonies (which are not generally rootable, they are usually grafted). The best time to do it is when the plant is in growing, generally in the summertime.

THE NEARING FRAME: A Superior Structure for Stimulating the Rooting of Cuttings

Dick's favorite way of doing propagation is using a Nearing frame, invented by Guy Nearing many years ago. (See drawing at the end)

Rooting Medium for the Nearing Frame

1st Layer (bottom) 2-3" of Canadian Peat Moss (Milled Sphagnum)

2nd Layer 3-4" deep layer using a well-mixed combination of:

1 part Perlite
1 part Vermiculite
1 part Turface
3 parts Canadian Peat Moss

Total depth of fill 6" with the objective being to create a light, moisture retentive, but well-drained medium. [Do not add sharp sand (it sinks to the bottom) nor shredded Styrofoam (it floats to the top)]. Wet the medium thoroughly for 2-3 hours and let sit for a few days until you can squeeze moisture from to the bottommost peat layer. Before adding cuttings fluff the top layer to aerate. After adding cuttings water to keep moist but not wet.

Replace the rooting medium every 2-3 years. Should a disease develop in any of your cuttings, quickly dispose of the contaminated material, and replace the rooting medium.

Alternatives:

1) A sand box filled with sharp sand and a bit of ground sphagnum (Canadian) peat only, covered with a screen for shade, and watered 4-5 times daily

2) A mason jar inverted over a cutting that is pushed into loose soil in a shady part of the garden

BASICS OF SEED PROPAGATION

by
Don LaFond

Don LaFond spoke next about starting plants from seed. Seed boxes are 12 inches deep (partly buried in the ground) and 2-3 feet wide and as long as you want to make them (Don's were 24 feet long), and filled 2/3rds full with a mix of ½ peat and ½ perlite, then covered with screening or hardware cloth. They don't have to be watched as closely as when they are in individual pots since the mix doesn't dry out as fast. The mix needs to be replaced after 1-2 years but this can be cost prohibitive.

Seeds can be grown in pots in a greenhouse or under lights using a roughly 50/50 ProMix seed starter mix (which is fine-ground peat) with perlite. He dips 4 inch pots into the medium, levels them off but does not tamp them down so that the seeds can get down into the medium. He experimented with topping the pots with ¼ inch of starter chick grit, or Turface, and found that the pots that weren't gritted did better for him. So he does not grit the first year but does grit pots that get put out in the cold frames if they don't germinate the first year to help keep moss off the surface. Pots are first put in the dark and after each month he checks

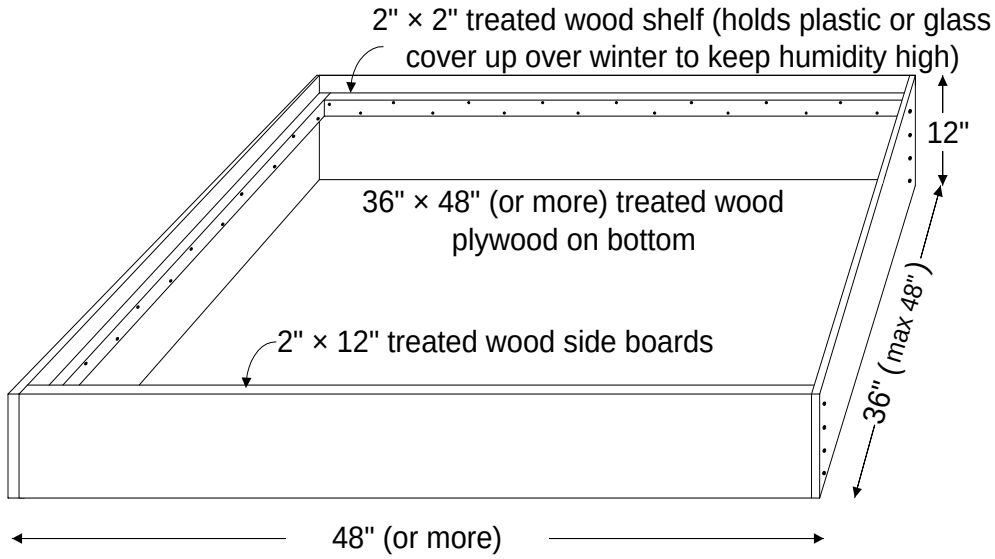
for germination and puts any that have germinated on top of his table so that they get enough light. In the first year, 50-70 percent of his seeds come up. Those that don't he grits and puts out in his frames for up to three years to allow for slow germinators. Don transplants any seedlings that come up fairly soon, except for bulbs, he leaves them in the pot for three years to bulk up before transplanting them. Once the seeds are ready for transplanting (when they have 1-2 true leaves) he taps the pot over to release the seedlings from the pot then, gently teases them apart into smaller bits or individual plants and plants them into a compost mix, only hand watering plants if they need it for the first year. He uses a very fine rose-head on his watering can to water his seed pots and transplanted plants. For some slow germinators (like *Glaucidium palmatum*) Don uses GA-3, Gibberillic Acid, at 1500 parts per million. He soaks a paper towel with GA-3, and lays out the seed on the paper towel, folds the paper towel and puts it into a Ziploc bag. He looks in the bag every day, and after about a week, when the radicle starts to show, he places the seed in a pot, he sticks it in sideways so that way he doesn't worry about planting it upside-down. GA-3 can stimulate too much growth if it's the wrong strength or left on GA-3 paper towel too long.

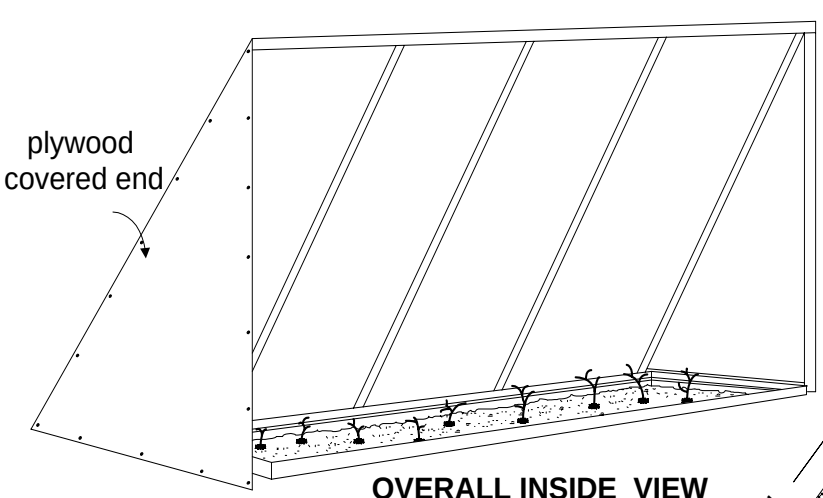
PROPAGATING DIFFICULT SMALL SEEDS

by
Tony Reznicek

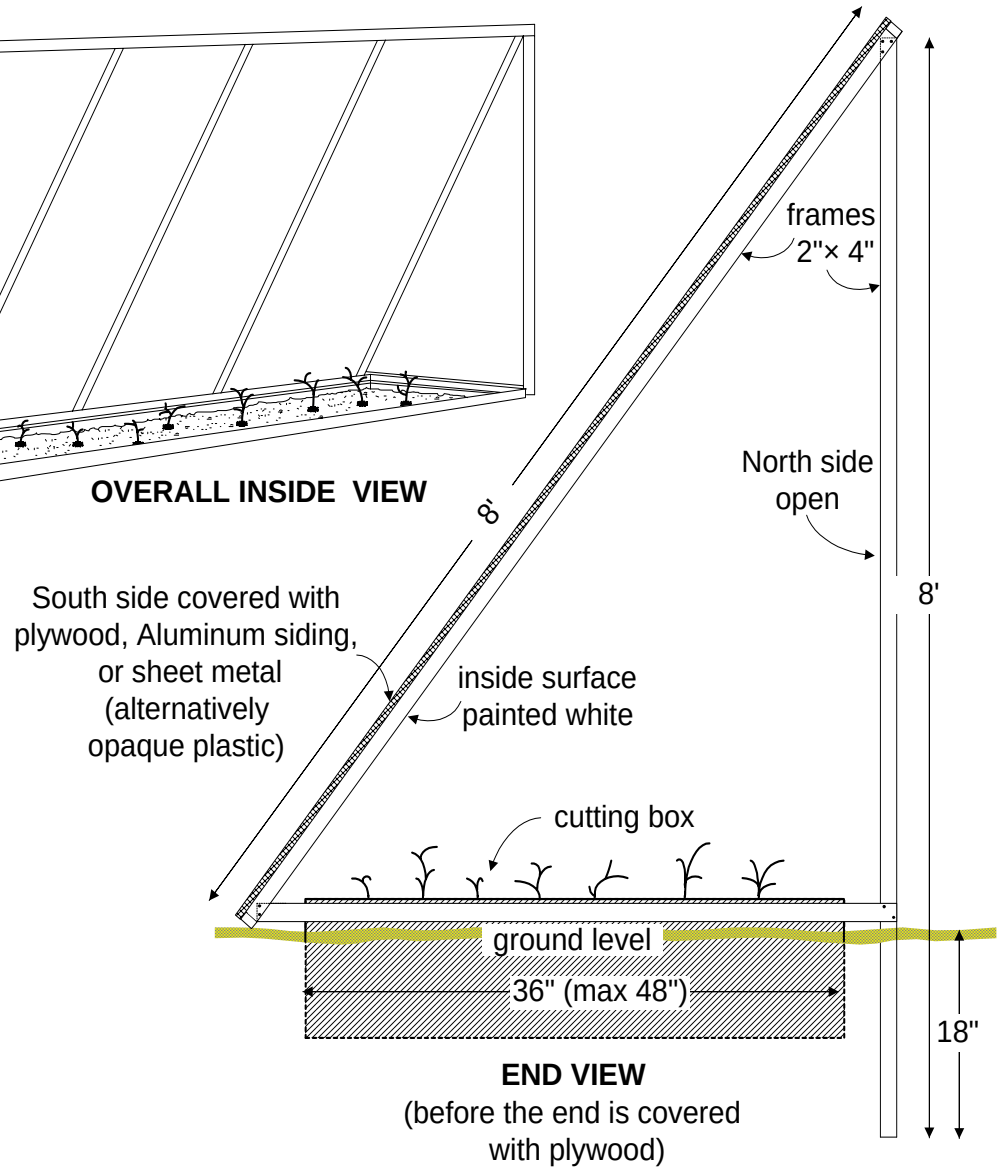
Tony Reznicek finished the workshop with a discussion about growing some tiny seeds. There is a wide range of things plants do to disperse seeds and some have specialized by having dust like, wind-dispersed seeds. These present some special problems as they generally germinate in rather peculiar and sensitive sites, for example, most members of the *Ericacaeae* family germinate on habitats like moist peat, moist sand, and moss mats, or Gesneriads, which grow on cliffs and have to get their seeds up into the crevices of the cliffs. Another family where the seeds are like that are the *Diapensiaceae* which include *Shortia* and other interesting and generally difficult to grow plants. Tiny seeds don't have much stored food, so the seedlings have to start photosynthesizing right away. The seeds also generally have no dormancy. Once they hit a spot they have to start growing. Some require light to germinate, so they cannot be buried. Typically they germinate in micro-sites, where there is not only moisture, but high humidity. If you grow them in open pots, it's much harder to keep them going. The hardy Gesneriads like *Ramonda, Haberlea,* etc., are very slow growing, so you can't just sow them in a seed pot, and put them in the garden by the end of the summer. You have to keep them going for quite a long time, and it presents special problems maintaining suitable conditions for a long time without fail. Through trial and error, Tony has found that the way to easily handle these seeds is to grow them in containers (like deli containers, with a clear domed top) where you can keep them sealed. He usually puts about an inch of soil in the bottom, with a tiny pin hole in the top. This will stay moist for weeks without adding water. The soil mix has to be fairly fine because it has to form an even surface, so that the seeds stay on the surface, and it has to be made flat and firm by gently pressing the surface after filling the container. Also, if you are growing *Ericaceae* or *Diapensiaceae* you need to be sure that your mix is acidic.Water with a fine mist and use only rain water. Since there is no drainage hole in the container the medium would accumulate salts if you used tap water. You can expect germination within a few days or a week or two at the most, if it has not germinated within that time then it likely is never going to. Tony sows thickly because it takes the seedlings a long time to get big and it will help keep down moss germination, he doesn't sterilize the medium as he has not had good luck with doing this. To keep them growing as fast as possible, Tony has them under lights and gives them 18 hour days. The plants think they are in late spring, when they would normally be growing their fastest. Transplant Gesneriads seedlings when they are 3-5mm across and they have 2-4 true leaves. Tony uses a little stick to pry them out as they have very little in the way of roots at the first transplant stage. You'll put them into another of the same type of container growing them until they are between the size of a dime and a quarter, before hardening them off and putting them outside. For Gesneriads, it takes about 1½ years to get a plant you can put outside. Ericaceous plants are faster and you can push them some with fertilizer (but not *Diapensiaceae*). He keeps the seed containers in the basement, so they stay about 60°F. Smaller round, domed containers work better, Tony uses some from TCBY, and Gordon Foods (GFS) also has some that may work, (Ziploc, Gladware, and Tupperware may be too big, and he's not sure if the colored lids would affect growth) but beware – some plastics deteriorate in light. Tony's method would work for other small seeds and is suited for plants that are very sensitive to drying when they are small. This method would also work for pitcher plants – *Sarracenia*. Other things that could be done this way include willows – *Salix*, but they have a somewhat short seed viability.

BOX FOR SEED BEDS OR NEARING FRAME





OVERALL INSIDE VIEW



END VIEW
(before the end is covered with plywood)