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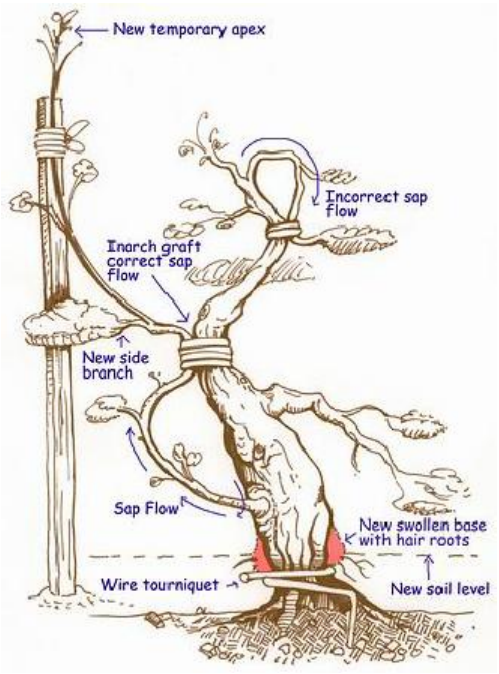
Sap Flow (Part 2)

In the last issue we learnt how Xylem transports water and minerals up to the leaves. The minerals and water are combined with radiant energy from the sun by chlorophyll (the green cells) in the leaves, to form starch and proteins (sap). These are then transported to all the growing areas of the plant via the Phloem.

It is important to note at this point that most plants are positively phototrophic, meaning they grow upward toward the light. Even the horizontally biased and procumbent species still tend to have foliage that grows upward.

This means that most of the nutrients will be directed to the highest point of a tree. This is simply to encourage the tree to grow upward and ultimately bigger.

The illustration shows a tree that is in a bad way and probably should be scrapped. It does show however, how sap flow can be used to correct some of these problems. The water shoot at the base on the left is too low to make a good first branch. However it can be grafted in place further up the trunk to replace the missing branch. This is called an Inarch Graft. The thin shoot has been left to grow long. It is then staked up so that its apex is higher than that of the main tree. A suitable side branch has now been grafted into position. Grafting is a very involved process and will be covered in detail at a later date, but what is relevant to this article is that the new apex will get the bulk of the nutrients, which will cause the graft to heal much more quickly. The direction of sap flow is correct for this graft. The graft on the right toward the top of the tree is in opposition to the flow of nutrients and is wrong. This graft will not take! Of course, after an inarch graft has set, the lower and upper bits will be removed to leave just the side branch. This may take a couple of seasons.



Warning! The new apex will rob the rest of the tree of nutrients, but regular pruning and nipping back will push the nutrients backwards to sustain these areas. When and how often can only be gauged by the grower. This is where art takes over from science.

Reverse taper is another problem that can be corrected, but it takes a bit of time. The point where the trunk joins the roots is narrower than the rest of the trunk. This is very un-cool and reverse taper is probably the most common of all problems. A tourniquet of wire can be wrapped around the base just below the narrow point. The soil level is now raised so the area is covered. Over time the downward flow of the sap to the roots will become inhibited by the wire, and sap will collect above it. This will cause more growth in the narrower point. In time the trunk should swell out like an elephant? s foot, and new roots will appear above the tourniquet. Eventually the old roots can be removed, and you will be left with a stunning bonsai with radiating roots all correctly positioned.