

# The Art of Bonsai

By Eugene Howell

In previous Newsletter articles we have covered the major environmental elements that all plants require in order to survive and have also taken a brief look at the critters and diseases that can attack a plant.

With this knowledge digested (hopefully), it is appropriate that we learn something about what a tree really is; otherwise we have little ability to understand the true nature of the living thing we are trying to develop to our desires. This subject is sufficiently broad that it will be impossible to discuss it adequately within the limited space allocated in one issue of the newsletter. This article, therefore, will be continued in subsequent monthly issues of it.

If asked what the major parts of a tree are, what would you answer? Some people may say “Who cares?”, but if you pause for a moment to think about it, you should quickly come to the conclusion that if you have no understanding of how a plant functions, how will you ever be able to understand what you need to do to a tree in order to get it to develop into an excellent bonsai? Furthermore, you will have no prior knowledge of how a plant will respond to actions taken by you. This is critical. You must know what to expect from a plant or you will never be able to develop it the way you envision it as a finished bonsai. The more you know about the basic functioning of a tree, the faster you will be able to turn it into an acceptable bonsai.

All of this is well and good, but what does it mean? Simply put, you need to know the six organs of a tree, what each one does, and how they work together. With this knowledge you can intuitively figure out how a tree will respond to your training

The organs of a tree are the roots, trunk (which includes the branches), leaves, flowers, fruit, and seeds. From a bonsai standpoint the ones in which we have the most interest are the roots, trunk, and leaves, so let's first discuss them.

The root system does three jobs. It holds up the plant, takes in water and nutrients, and stores food. In nature, the root system typically extends two or three times further from the trunk than does the tree's canopy. Water and nutrients are absorbed by the roots through “root hairs”. These very tiny (much thinner than a human hair) one cell structures pass the water and nutrients into the xylem layer. This then transports them to the leaves where they are converted into food for the plant (interestingly, plants are about the only living things that manufacture their own food). The water and nutrients are not what the plant uses for food; it converts these into complex sugars. This is the food that is transported to all parts of the plant for consumption.

The trunk holds up the canopy and gives it sufficient spread to insure that the leaves are exposed to sunlight. It consists of five layers; the bark, phloem, cambium, xylem, and heartwood. The layer of most critical interest to the bonsai enthusiast is the cambium layer, for it is this one that plays the biggest role in the development of a bonsai. If you fully understand what this layer does, then you can easily understand why a tree does what it does when you develop it into a bonsai. If you eventually cannot remember what any of the other layers do, you must remember this one.

The bark is a water-tight barrier that protects the interior of the trunk from insects and diseases. Because of this, the less damage that is done to the bark, the greater is the probability that the tree will remain healthy.

The layer inside the bark is the phloem. It has the job of transporting to all parts of the tree the food manufactured by the leaves. This bit of information is important to remember when air-layering a plant.

The layer just inside this one is the cambium. This is the growth mechanism of the plant. It is this layer, made up of cells called “meristem cells”, that creates all new cells within the tree. If this layer ceases to function properly, the plant dies. When you prune a tree to develop ramification, the cambium layer is what does it. When you watch for new buds to pop on the trunk so you can develop a new branch, you are watching for the cambium layer to do this. When you girdle a branch during air-layering, you are trying to get the cambium layer to start growing roots at that spot. When you defoliate the tree you are counting on the cambium layer to force new (and smaller) leaves to develop. When you perform root pruning every couple of years, you are counting on the cambium layer to develop finer roots to replace those cut away. When you collect a tree from the wild and chop the trunk to a height of 3 or 4 feet, you are hoping that the cambium layer will develop new buds at the cut so you can grow a new apex.

I hope I have made the point that remembering what the cambium layer does is important!!!