The Anatomy of a Bent Tree

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Dendrochronologists have told us that when a marker tree is bent the cambium layer of the tree is crushed on the inner part and stretched on the outer part of the bend in the tree. As a result, the flow of nutrients to the tree is greatly impacted, the tree becomes stressed and its growth changes dramatically. From the time the tree is bent, the growth of the tree is much slower than normal and the size of the tree remains small even though it is can be very old.

Monument Road in Pickens and Dawson County, GA is built along the backbone of the end of the Southern Appalachian Mountains. This ridgeline was at one time an Indian Trail going from a Cherokee Village site on the eastern slope of the furthest southern mountain (Mount Oglethorpe) north toward the Coosawattee Cherokee District which was located some 30 miles north near Ellijay, GA. Branch trails led off of the main trail to Sharptop and Amicalola Mountain which were thought to be sacred to the Cherokees. Later in the early 1930’s, this trail was improved to become the Appalachian Trail which began at that time at the summit of Oglethorpe Mountain which was previously known as Grassy Knob. On this trail are many Marker Trees some of which have been cored to age them to the late 1700’s and early 1800’s. One tree near the Cherokee Village site was aged to 1768.

In May 2013, an owner of property on the ridgeline which had two marker trees on the property cut down one of the trees in order to build his house. He was told before cutting it down that it was a marker tree and sacred to the Cherokees but he cut it down anyway. Interestingly, after he cut it down he was verbally attacked by many people who live on the mountain and had respected that tree since they had moved to the mountain. The owner has voiced his concern to a number of us that he hopes the community will not burn his house down when he gets it finished.

The tree that was cut down is shown in the picture to the right. This tree
was in the shape of a “4” tree and had a diameter of approximately 24 inches. The horizontal part of the tree was bent down at about a 45 degree angle and numerous appurtenances were growing on the bent portion of the tree. The tree is located about where the old trail was determined to be. Associated with this tree was another tree that is considered to be a “water marker” tree which has shown to indicate the existing of springs located off of the trail. At the site of these two trees is a spring located within 100 ft. downhill from the two trees. Near the spring is another marker tree pointing to the spring.

After the tree was cut down, I asked the owner to allow us to cut a “cookie” section of the base of the tree so that we could analyze the tree rings to age it and to learn about the life of the tree. He granted us that request and a “cookie” was cut off of the base of the tree.

**Tree Ring Anatomy**

The picture below shows the effect of bending the tree. At the time the tree was bent which occurred between its fifth and tenth year of life, the tree rings were bent in towards the center of the tree from the opposite direction of the bend. Before the tree was bent, the growth rings were in a generally circular pattern. After the tree was bent for several years thereafter, the rings formed a pattern wherein the rings continued to be bent toward the center of the tree on the side of the tree opposite from the bend. Eventually, the rings became circular again and the tree ring growth pattern was very tight showing that the tree was stressed. For the first fifty years of age, it
had only grown to a diameter of 7 1/3 inches. Based on our previous knowledge from studying cores of bent trees, we would expect the tight growth pattern to persist throughout is entire life. However, something changed in the life of the tree. Beginning about the fiftieth year and continuing to the seventieth year, the tree began to grow more normally having large growth rings and adding another 3.25 inches in diameter which about doubled the size of the tree in twenty years.

From the tree’s seventieth year to about 120 years of age, the tree reverted back to acting like a bent tree. The rings during this period of growth shown above are so close together it requires a magnifying glass to discern the number of rings. During this period, the tree added two inches in diameter and fifty years of age. The last thirty three tree years of age of the tree added another three inches of diameter which is a higher growth rate than the previous fifty years. This is somewhat surprising since there were several periods of high drought during the time period and one would have expected the tree to show that drought condition but it did not.

The picture on the next page shows the changing in growth patterns over the life of the bent tree.
The Dichotomy of Tree Growth Patterns and Age of a Probable Indian Marker Tree

The table below shows the details of the variability of the growth periods of the Monument Road Marker Tree. The variability in growth does not seem to follow a pattern driven by environmental conditions and tree bending as one would expect to find. The exact nature of these different growth rates is unexplainable. We no longer have the core data for trees in the near vicinity of this tree so no comparison can be made to better explain these odd growth patterns. This tree was located on rock overlain with a thin layer of poor soil. Perhaps at times, the root system for the tree got into better soil in which to extract more nutrients and water to help the tree grow better. Whatever the reason, it seems to be a very odd growth pattern.

<table>
<thead>
<tr>
<th>Period (yrs.)</th>
<th>Growth Rate</th>
<th>Age at End of Period</th>
<th>Diameter at End of Period of Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-50</td>
<td>13.75 yrs./in</td>
<td>50</td>
<td>7.3 inches</td>
</tr>
<tr>
<td>50-70</td>
<td>6.15 yrs./in</td>
<td>70</td>
<td>13.8 inches</td>
</tr>
<tr>
<td>70-120</td>
<td>25 yrs./in</td>
<td>120</td>
<td>17.8 inches</td>
</tr>
<tr>
<td>120 - 153</td>
<td>10 yrs./in</td>
<td>153</td>
<td>23.8 inches</td>
</tr>
</tbody>
</table>

The tree began its life around 1860 and was bent probably around 1865-1870. At the time it was bent, the majority of Cherokees had been removed from this area by 1838 so it would seem that the tree might not be a marker tree. However, recent studies of numerous locations in the US once occupied by Indians, has shown that not all Indians left during the removal period. Many families are now being found whose heritage is Indian and who hid for 150 years to avoid being discovered and being removed to OK. Some of these family members today will not disclose to anyone outside of the immediate family that there are of Indian descent for fear of someone finding a way to take away their property and causing them to be removed. What is unknown about these families is whether they continued to practice their Indian custom of bending trees to mark significant places.

It has been speculated by some that the bent trees were caused by other trees falling on them from conditions that occur in violent storms. This is certainly the cause of some bent trees. Also, nature can cause some trees to be bent like the Indian Trees. In regard to the tree that was cut down, there is a large amount of evidence in the area of the tree to make it more likely to be of Indian origin. There are a number of similar marker trees within five miles of this tree four of which are of identical configuration. These trees are shown on the following pages. Also, the Indian Trail location makes it more likely to be of Indian origin even though it dates to 1860.