**The Legacy of the** **Rings**

“Nature is a book of many pages, and each page tells a fascinating story to those who learn her language.”

 Andrew E. Douglass, 1922

When you look out of your window, you can tell what any particular day’s *weather* is like. But that doesn’t tell you much about your region’s long-term *climate.*

Can you remember all of the general weather patterns that your region experienced during your entire lifetime? This is your regions *climate*. Is it now generally warmer or colder than it was years ago? Is it mostly dryer or wetter? If you had been keeping a weather diary every day, you would know. (The National Weather Service has been keeping a daily weather diary, but only since 1891!)

But that big tree in your backyard has been keeping a detailed *climate diary* for you, for its entire life.

In southern Virginia there is a huge White Oak tree that has been writing a climate diary for the last 500 years.

And, there is a Bristlecone pine in California that has been keeping it’s climate diary for 4,850 years. It was born in the year 2,831 BC! If nature is a book of pages, this book would be 4,850 pages long.

Wouldn’t it be great if we could read all of those diaries? If we could understand Nature’s language, we could read about what the weather was like *each year* for the past decade, or century, or millennia, or even the past 5, 000 years! We could read about how hot or cold it was, how much rain there was, or if there was a forest fire or even an earthquake!

As it turns out, we CAN read the stories that trees write in their diaries, and we can do it right here, at Stop 6!

Here, there is a cross section of a Black Locust tree, cut through with a chain saw to expose the tree’s annual *growth rings.*

Every year, as a tree grows, it adds a new ring of growth to its outermost layer, just beneath the bark.

This new layer of wood is made by a very thin layer of specialized cells called the *cambium.*

Each of these new layers is visible as a *growth* *ring,* whichyou can see and feel in the exposed cross section here.

And, each ring is composed of two distinct layers.

The inner layer is wider and is softer wood that was added during the spring and early summer. It feels slightly depressed or concave. It’s called *early wood.*

The outer ,thinner layer, is harder wood that was added during the fall, when growth is slower. It feels slightly raised. This layer is called *late wood.*

You can tell the age of the tree if you count the ridges of late wood, starting with the outer most ring and working your way in toward the center.

Estimating the age of a tree using this method is called *dendrochronology*

You can also observe that the rings vary in width. The wider rings grew during years that were wetter or warmer. The narrow rings grew in years that were dryer or colder.

Estimating past climate conditions using this method is called *dendroclimatology.*

All of the locust trees of a similar age in these woods will have *identical* patterns of growth rings.

All of the other species of trees of the same age in these woods will have *similar* patterns of growth rings, because they will all reflect the same weather conditions that they grew in.

Now, imagine if we could look at the growth rings in one of the old locally grown construction timbers used to build Mt. Bleak House in 1844.

And imagine, too, looking at the growth rings of a living 300-year-old local white oak.

If we compared the two, we would see that the construction timber had a *growth ring* *pattern* similarto the section of the living white oak that was growing around the year 1844.

We could tell the exact year that the construction timber was cut.

Andrew E. Douglass (author of the opening quote) used this principle to date Ancient Anasazi and Pueblo dwellings in the US Desert Southwest. He compared the growth rings of living Bristlecone Pines, dating back to AD 700, with the growth rings in Bristlecone pine construction timbers used in the ancient Indian Cliff Dwellings. He was able to date them to the exact year (and even to the season) that the timbers were cut.

He determined that construction of New Mexico’s Pueblo Bonito began in the year 850.

All from tree rings!

Tree Rings truly are Nature’s ‘Book of Many Pages’.

We have learned her language.

And now we can read her stories.

 Submitted by Paul Guay