



## 18.1 Andrew Ellicott Douglass

*Douglass, a successful American astronomer, is better known as the father of dendrochronology. His accomplishments in tree ring analysis and cross-dating allowed him to create a tree calendar dating back to AD 700 for the American Southwest.*

### Vermont Native



Andrew Ellicott Douglas was born on July 5, 1867 in Windsor, Vermont. Andrew was one of five children born to Sarah and Malcolm Douglass. Malcolm, an Episcopalian minister, and his wife moved frequently. They settled for a period of time in Windsor where Malcolm became a minister for St. Pauls Church and

they raised their children.

Douglass attended Trinity College in Hartford, Connecticut. An astronomer, Douglass worked at Harvard College Observatory from 1889-1894. While working for the observatory, he traveled to Peru to find a suitable location for another observatory. He helped to establish the Harvard Southern Hemisphere Observatory in Arequipa, Peru.

### From sunspots to tree rings

When Douglass returned home, he met astronomer Percival Lowell of Boston, Massachusetts. Working for Lowell, Douglass set out again to find a location for an observatory, but this time in Arizona. In 1894, he found a site on a Flagstaff mesa and oversaw the building of the Lowell Observatory. While at the observatory, Douglass was Lowell's chief assistant and worked with Lowell to observe the planet Mars. However, Douglass and Lowell did not always agree on how to use the gathered data and Lowell fired Douglass.

Douglass remained in Flagstaff to teach Spanish and geography at what is now known as Northern Arizona University. While in Flagstaff, he became interested in tree rings and their possible connection to sunspot cycles. While researching the eleven-year sunspot cycle, he examined ponderosa pine tree rings. He noted that rings held information about weather patterns and hoped he could find a link between periods of drought and sunspot activity.

In 1906, Douglass moved to Tucson, Arizona and taught at the University of Arizona. Here, he created the science of dendrochronology. He found that differences in tree ring width corresponded to weather patterns. A period of drought produced narrower rings than a time of increased rainfall. In 1929, Douglass was able to place a date on Native American ruins in Arizona with accuracy. He studied Ponderosa pine tree rings dating back to the time of these Native American dwellings. He matched wooden beam samples against pine tree rings to determine a precise date for the ancient ruins. Douglass development of this cross-dating technique was a tremendous breakthrough in the field of archaeology. Archaeologists now had a tool to date ancient ruins.

Despite his work in tree ring analysis, Douglass remained an active astronomer. From 1918 to 1937, Douglass worked at the Steward Observatory at the University of Arizona. Within this period of time, he also wrote *Climate Cycles and Tree Growth, Volumes I, II, and III*. In 1937, he retired as director of the observatory and devoted his time to tree ring research.

### Dendrochronology and beyond

Douglass quickly discovered that tree ring studies required time and physical space. He asked the University of Arizona president for a tree ring research facility. In 1938, Douglass became the first director of the Laboratory of Tree-Ring Research at the University of Arizona. The Laboratory of Tree-Ring Research has the largest number of tree ring samples in the world. He remained director of the laboratory until 1958.

In 1984, an asteroid was identified and named Minor Planet or Asteroid (2196) Ellicott, after Douglass middle name. Douglass died on March 20, 1962 at age 94. Later, Spacewatch astronomer Tom Gehrels discovered an asteroid in 1998 using a telescope that Douglass had dedicated to the Steward Observatory many years earlier. A second asteroid was then named after Douglass. On the planet Mars, a crater has also been named in honor of Douglass.



## Reading reflection

1. How did Douglass move from studying planets and stars to studying trees?
2. What is the name of the science and specific technique that Douglass discovered?
3. How has Douglass work with tree rings been useful to archaeologists?
4. **Research:** The first asteroid named after Douglass is called Minor Planet (2196) Ellicott. What is the name of the second asteroid named after Douglass?
5. **Research:** The Harvard Southern Hemisphere Observatory, also called the Boyden Observatory, was originally located in Arequipa, Peru. It has moved. Where is the observatory now located?
6. **Research:** Tom Gehrels is an astronomer associated with the Spacewatch program. What is the Spacewatch program?