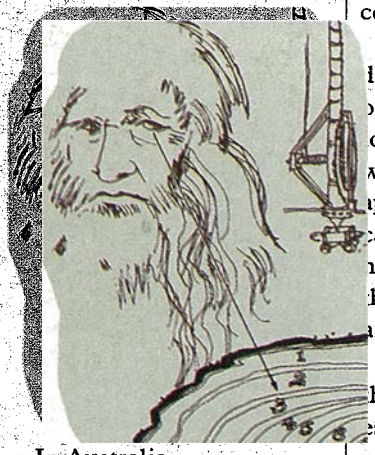
BACK BOX

Tree rings are (sometimes) annual

More than four centuries ago, when our oldest mountain ash was just a sapling, Leonardo da Vinci recognized the annual character of tree rings.



In Australia, dendrochronology — the dating of tree rings — is a field still in its infancy. However, with the recognition that ancient tree rings can give us a clue to the climate in which they were formed and the atmospheric composition at the time, the subject is rapidly growing. Dr Graeme Pearman and his colleagues at the CSIRO Division of Atmospheric Physics are examining 2000-year-old huon pines from Tasmania for evidence of prevailing conditions in past millennia.

Tasmanian conifers are desirable specimens to work on because they are long-lived and, as anybody who has lived on the isle will appreciate, not even a tree can fail to tell when winter has come. Growth rings therefore show a regularly annual pattern.

That is not always true for the rest of Australia, especially for this continent's most abundant trees, the eucalypts. While deciduous trees go through a regular annual cycle, the evergreen gum trees grow when they can — after rain usually.

Most of Australia experiences seasonal climate variations of one sort or another, and eucalypts do, of course, show growth rings.

This *Eucalyptus tetrodonta* was 22 years old, a fact not readily apparent from its rings.

But be warned that even Leonardo would probably arrive at the wrong age if he tried counting them. Because of drought, fires, unseasonal weather, and plagues of leaf-eating insects, gum trees are prone to leave out rings, or put on extra ones, as easily as drop gum nuts.

In a recently published paper, Mr Stefan Mucha of the CSIRO Division of Forest Research relates how even in monsoonal Darwin, where the summers are always very wet and the winters extremely dry, tree-ring counting is difficult and beset with likely errors.

For 2 years Mr Mucha measured monthly the girth of nine *Eucalyptus tetrodonta.* These specimens, growing near Darwin airport, were protected from fire, but were otherwise typical of much of the low open forest of the Top End. As expected, the trees' growth was distinctly seasonal; it was confined to the wet season.

With this knowledge he sought trees of known age, keen to count their rings. He found a stand known to have regenerated (after clearing) between 24 and 27 years earlier. They too had been protected from fire.

When the trees (14 of them) were felled, Mr Mucha was surprised to find how indistinct the growth rings were. Even after smoothing with a very fine-grained sandpaper until the larger cells (the vessels) were visible under a hand lens, the rings on each sample disc were no clearer than in the specimen shown in the photograph.

Undaunted, he set to work to date the trees. With close examination of many radii, and rejecting a number of false rings, he was able to correctly date 9 out of the 14 to within the appropriate 3-year time span.

That's not bad, but then he knew what answer he was looking for. He tried some other samples on six forester colleagues. These samples were 38 cross-sections of eucalypts of unknown age from Melville Island.

Results this time were not so good: in no instance did all the foresters agree. Although they had no special training or experience in ring counting, the extent of the disagreement was remarkable. Only once did three of them agree, and agreement by two occurred in just 14 out of the 38 samples.

One forester assessed twice as many rings as another on the same sample.

There's more to dendrochronology than counting rings, in Australia if not in Italy.

Andrew Bell

Estimation of tree ages from growth rings of eucalypts in northern Australia. S.B. Mucha. *Australian Forestry,* 1979, **42**, 13–16.