Archive Space Expanding for 'National Treasure'

• *By Melanie Lenart*

Like the feet of a child forced to wear the same shoes year after year, the Laboratory of Tree-Ring Research's archive collection has long been stuffed into a space far too small for its growth.

Finally, the new school year started with a change in size. This fall, LTRR staff began transferring a portion of the many thousands of tree-ring samples collected over the past 90 years into a new archive area, located in the basement of University of Arizona's Building 45. Known to others on campus as Math East, the facility has been dubbed "Tree-Ring West" by local dendrochronologists.

The old storeroom in the LTRR's main facility in the football stadium, above, is filled with specimens collected over the past 90 years from sites all over the world.
Photo by Thomas W. Swetnam

In addition to archival space, Tree-Ring West now contains the equipment for measuring tree rings down to a tenth of a millimeter, a multi-purpose room for seminars, and areas for processing wood. Construction of a new building called Environment and Natural Resources II (ENR II) is slated to begin in 2004, and will house new offices and labs for LTRR, as well as a much larger archive for the rest of LTRR's collections.

"Our storeroom in the West Stadium was overflowing," noted LTRR Director Thomas Swetnam. "There's no place else in the world that has a larger or more valuable collection of tree-ring materials."

The importance of LTRR's collection was noted by a seven-member committee, including top scientists from other universities, that conducted an Academic Program Review of the LTRR in 1999. As one of its chief recommendations, the committee urged re-housing the archive.

"Given the unique nature of this collection, arguably a 'national treasure,' it seems to the committee that a strong case could be made for federal and/or foundation support to catalogue and maintain it," the committee stated in its report.

LTRR researchers are currently seeking support from both federal agencies and private donors.

"It would be great if we could find a donor to help us really expand the concept of a working archive to go into our new building. This, of course, could be a match or partial match for our existing $1 million gift from Agnese Haury," Dr. Swetnam said.

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For instance, the director would like to see part of the archive in the new ENR II building double as a museum that members of the public could tour. Swetnam envisions interpretive displays of some of the more spectacular samples, computer stations where people could try their hand at cross-dating tree-ring samples, and other educational features.

"One of the great things about tree rings is that they're very tangible," he said. "We find that students relate to specimens, like a tree with bullets embedded in it from somebody doing target practice – little kids just love that – or where a tree has grown around old barbed wire."

Cross-sections from giant sequoias also tend to be crowd-pleasers. Fire history work, Swetnam's specialty and one that has attracted dozens of graduate students to the lab over the years, generally requires cross-sections or at least wedges of trees. In the past 15 years Swetnam and his colleagues have collected cross-sections from the stumps of majestic California sequoias. Some of these stumps measure 30 feet across.

"Part of our problem with space has been precipitated by the fire history work, in particular, giant sequoia," he admitted. "I always joke with people, it's sort of like I work on dinosaurs, so my fossils are these gigantic fossils. And all my colleagues work on small mammals or insects."

The "insects" of tree-ring collections are pencil-sized cores from living trees, or penny-wide cores from archeological beams. Although the individual samples don't take up much space, consider that LTRR researchers over the years have collected more than 2 million specimens.

Subfossil wood, especially long-dead remnants of long-lived bristlecone trees, is another category that requires space. Although bristlecone pines can fit 3,000 or 4,000 years of tree rings in a section of wood the length of a cat, these pieces add up. LTRR researchers began collecting bristlecone cores and subfossil wood half a century ago, and researcher Thomas P. Harlan and others continue the effort today. (For more on the history of LTRR's

Senior Research Assistants Rex Adams, left, and Christopher Baisan fit a sequoia wedge into the new archive in "Tree-Ring West." Photo by Melanie Lenart

bristlecone collection efforts, see *http://www.ltrr.arizona.edu/trt/20011221.pdf* .)

Tree-ring researchers still find value in the older collections. For instance, LTRR Research Associate Matthew Salzer, whose proposal with Professor Malcolm Hughes just received three years of National Science Foundation funding, is sifting through some of the bristlecone samples collected from California's White Mountains by the late Valmore LaMarche back in the 1970s.

By combining information from Professor LaMarche's samples with his own from the Whites, Dr. Salzer can expand the sample size and strengthen the climate analyses without spending extra money.

"Going off to remote places and collecting tree rings is generally the most expensive part of a tree-ring research venture," Salzer noted. "If we've got these archives well-organized and available, we can do important research without having to cover the expense of going to these remote places."

Swetnam also emphasized the importance of the archives for ongoing research.

"The value is it's really something like a library of environmental information," he said. "These volumes of information that we've collected, we've read parts of them but there are unread chapters. I'm sure with new technologies, and new kinds of indicators we will discover that are present in the tree rings, that we'll be going back to this wood to learn new things."

Salzer noted that since LaMarche's time, computerized statistical and graphical tools have come into practice that facilitate crossdating remnant tree-ring samples. This is particularly true with bristlecone pine, where dendrochronologists must search for the best dating match of unknown time sequences that might be a few hundred years long, in comparison with existing chronologies that are up to 9,000 years long. These new tools enable Salzer to establish dates for previously collected wood that had previously gone undated.

In another example of researchers exposing old wood to new technology, a team that includes LTRR Professor Jeffrey Dean has used strontium isotope ratios in construction-beam samples to illuminate wood resource use between 850 and 1150 by the Anasazi occupants of Chaco Canyon, New Mexico.

Earlier tree-ring analyses had established that these ancestors of the modern Pueblo had abandoned their complex structures in the late 12th Century. The strontium research expanded the story by pinpointing the source of the timbers used in construction to two of three mountain ranges in the area. (The bristlecone link at the top of the page to the Winter 2001 issue of the Tree-Ring Times includes a page 4 story on this strontium research.)

Swetnam expects that scientists will continue to find innovative ways to extract more knowledge from the LTRR's archives. For now, the priority is to put information on the samples in one large, online database so researchers will not have to depend on numerous paper files to access these resources.

Several LTRR faculty members working with Dr. Sudha Ram, a renowned professor of the UA Management Information Systems, have requested NSF funds to catalogue the archives and digitize the information associated with certain specimens. With enough funding, Swetnam envisions that the project could even include photographing and scanning some samples so tree-ring researchers around the world could access "virtual" specimens via the web.

"This is just the beginning," Swetnam said. "I have a sense that some time from now, maybe it'll be a century or more, the value of this wood will be much increased over what it is now. Because as time goes on, wood is disappearing, ancient forests are being cut down or are dying for various reasons. There's loss of material. What we have here is an archive that is non-renewable. It's a legacy of the Tree-Ring Laboratory."