

II. Accuracy Test of LTI TruPulse 200

How accurate are the instruments used to measure trees? The LTI TruPulse 200 and 360 were exhaustively tested for accuracy of the laser. The following table shows a typical result. For each target, the point of distance reading change over in the viewfinder was first identified. The distance at that point was then independently measured with a Bosch GLR825 accurate to approximately 1.5 millimeters. As can be seen in the table, the average difference between the Bosch and TruPulse 200 was 1.96 inches. This is more accurate than advertised by LTI.

Test of laser-measured distance for LTI TruPulse 200 versus Bosch GLR825/GLM80						
No.	Target	Location	Bosch	TP200	Diff-ft	Diff -in
1	Yellow disk	Outdoors	38.0200	38.0	0.02	0.24
2	Yellow disk	Outdoors	46.7250	47.0	0.27	3.30
3	Yellow disk	Outdoors	57.0050	57.0	0.01	0.06
4	Yellow disk	Outdoors	59.8100	60.0	0.19	2.28
5	Calendar	Indoors	30.0100	30.0	0.01	0.12
6	Calendar	Indoors	24.8960	25.0	0.10	1.25
7	Tree trunk	Outdoors	55.5550	55.5	0.05	0.66
8	Tree trunk	Outdoors	156.7200	157.0	0.28	3.36
9	Tree trunk	Outdoors	163.9000	164.0	0.10	1.20
10	Tree trunk	Outdoors	165.8250	166.0	0.18	2.10
11	Tree trunk	Outdoors	176.8800	177.0	0.12	1.44
12	Tree trunk	Outdoors	202.2250	202.0	0.22	2.70
13	Building	Outdoors	169.0350	169.0	0.03	0.42
14	Tree trunk	Outdoors	220.4200	221.0	0.58	6.96
15	Tree trunk	Outdoors	224.5650	225.0	0.44	5.22
16	Tree trunk	Outdoors	131.0100	131.0	0.01	0.12
17	Tree trunk	Outdoors	153.4250	153.5	0.07	0.90
18	Tree trunk	Outdoors	169.8400	170.0	0.16	1.92
19	Tree trunk	Outdoors	264.0400	264.5	0.46	5.52
20	Tree trunk	Outdoors	202.9100	203.0	0.09	1.08
21	Yellow disk	Indoors	17.5430	17.5	0.04	0.52
22	Yellow disk	Indoors	20.1100	20.0	0.11	1.32
23	Yellow disk	Indoors	24.0490	24.0	0.05	0.59
24	Yellow disk	Indoors	25.0540	25.0	0.05	0.65
25	License Plate	Outdoors	28.7400	28.6	0.16	1.92
26	Yellow disk	Outdoors	57.8200	57.5	0.32	3.84
27	Yellow disk	Outdoors	17.8230	18.0	0.18	2.12
28	Yellow disk	Outdoors	89.8500	90.0	0.15	1.80
29	Yellow disk	Outdoors	105.8400	106.0	0.16	1.92
30	Yellow disk	Outdoors	119.8250	120.0	0.17	2.10
31	Yellow disk	Outdoors	133.8050	134.0	0.19	2.34
32	Tree trunk	Outdoors	33.0950	33.0	0.09	1.14
33	Tree trunk	Outdoors	104.4600	104.5	0.04	0.48
34	Tree trunk	Outdoors	110.1500	110.0	0.15	1.80
35	Tree trunk	Outdoors	123.9350	124.0	0.06	0.78
36	Tree trunk	Outdoors	147.7000	148.0	0.30	3.60
37	Tree trunk	Outdoors	88.0000	88.0	0.01	0.12
38	Tree trunk	Outdoors	141.0550	141.0	0.06	0.66
39	Tree trunk	Outdoors	96.2900	96.0	0.29	3.48
40	Tree trunk	Outdoors	124.4700	125.0	0.53	6.36
Average				Feet ==>	0.16	1.96 <== inches

III. Exceptional Trees of Mohawk Trail State Forest

We conclude with a summary of exceptional trees in Mohawk Trail State Forest as determined by NTS measurements. History books and newspaper and magazine articles give accounts of huge trees across the New England landscape in pre-colonial times, and they no doubt occurred. However, we'll never know how large, tall, and old they actually were. We can know with great accuracy what grows today, and we do have some exceptional forests in the Northeast. One of the most exceptional is the forest chosen for this workshop, Mohawk Trail State Forest. The white pines of Mohawk are the flagship tall trees of New England. The following table lists 300 trees that have been measured in Mohawk. So far as we know, the top 3 categories have been completely covered. There are probably at least 160 pines between 140 and 149.9 feet in height. There are many between 130 and 139.9.

White pines measured in MTSF since Oct 2009								
Grove/Area	Complete coverage --- >			Limited coverage ----- >			Total	Individually Tallest
	>=170	160- 169.9	150- 159.9	140- 149.9	130- 139.9	120- 129.9		
Trees of Peace	1	2	17	7	2	1	30	171.0
Elders		3	11	5	1	2	22	167.0
Algonquin		3	14	8	2		27	163.8
ENTS Grove		1	22	11		1	35	163.0
Pocumtuck		2	18	37	9		66	161.0
Shunpike		1	5	2	2		10	160.2
Trees of Peace - Mast Area		1	5	5			11	160.1
Trees of Peace - Rachael		0	7	1			8	154.4
Tuscarora		0	1	5	2		8	153.1
Cherokee- Choctaw		0	6	6	1		13	152.7
Trout Brook		0	5	11	3	1	20	152.6

Campground		0	2	2		4	8	152.3
Encampment		0	2	4		2	8	152.3
Cold River		0	1	7			8	150.7
Headquarters Hill		0	0	8			8	147.9
Frog Pond		0	0	6			6	147.5
Headquarters		0	0	3	2		5	146.0
Indian Springs		0	0	3	1	1	5	144.6
Todd Mountain		0	0		2		2	137.0
Total	1	13	116	131	27	12	300	
Total >= 150	130							



Bushwhack Hits Paydirt, CA

by **M.W.Taylor** » Sun Oct 07, 2012 1:50 pm

Last weekend I returned to the forest of the tallest known sugar pine with friends John and Ben to further explore the "hot zone". The "hot zone" is a series of well protected benches, meadows and gullies in Yosemite National Park. The terrain was mostly rolling hill type with a few flat bottomland areas.

Here are the trees we found:

Ht	Species	Location
273'	douglas fir	Yosemite National Park
264'	sugar pine	YNP
261'	sugar pine	YNP
258'	sugar pine	YNP
256'	sugar pine	YNP
255'	sugar pine	YNP
253'	ponderosa	YNP
251'	sugar pine	YNP

The 273' douglas fir is the 2nd tallest known tree of the sierras beside giant sequoia.

The 264' (80.4m) "Sugar Tower" puts the species back into the 80m club. The Yosemite Giant was the tallest known sugar pine and only one known to be over 80m but it died a few years ago. It has likely fallen over or lost its top by now.

I think eventuallly we will locate a 270' class sugar pine but it will require a lot of searching. An aerial survey might be necessary.

Michael Taylor

WNTS VP
California Big Trees Coordinator
<http://www.landmarktrees.net>



the three of us under the "Sugar Tower"



John below the tallest known sugar pine at 264 feet. After you get above the root swell on the "Sugar Tower", the trunk is cylindrical and very high to the first branch.

[Re: Bushwhack Hits Paydirt](#)

by **dbhguru** » Sun Oct 07, 2012 9:46 pm

Michael Totally awesome! You've smoked the rest of us! Can you list the trees that you've either found alone or with friends or confirmed for others that are the tallest of their species?

NTS, I propose a new list that shows the tallest member of each species that we know about and who made the discovery, who made the initial measurement, and who made the latest measurement. Dates of discovery, initial measurement, and latest measurement would be great. Minimal location information. I'd be happy to keep the data if people will send me the raw information. If this idea catches on, we could expand it to the state level.

Robert T. Leverett

[Re: Bushwhack Hits Paydirt](#)

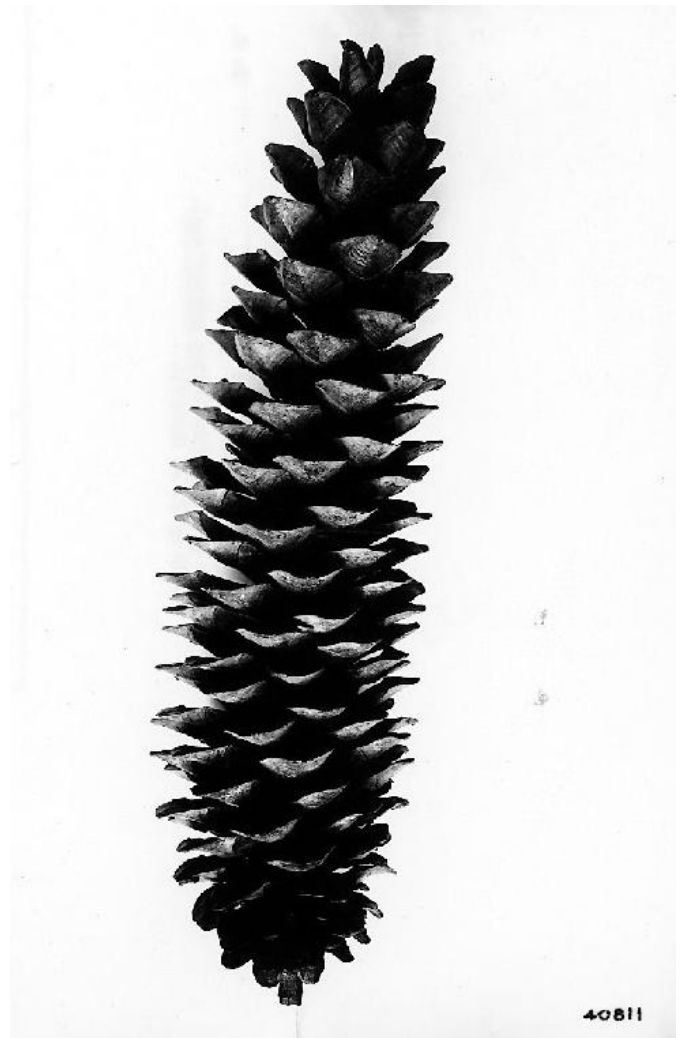
by **M.W.Taylor** » Mon Oct 08, 2012 6:13 pm

Bob, I can't remember all the tall trees I have found but at some point I'll make a list for you. My first focus was 350'+ redwoods. I know I found at least 120 of them alone or with others. After the LiDAR found all the rest of the tallest (350'+) redwoods I shifted my focus to the tallest firs and pines. The 80m+ species is still quite elusive. Red Fir is now my new focus. I want to locate an 80m+ red fir. Tallest known today is 252' or 76m.

Typically I explore the forests alone. But when I find a nice chunk of forest with multiple tall trees in a concentrated area (a hot zone) then I usually invite others to help me mop the place up. The extra set of eyes makes it more likely we'll not miss anything during the search and also I like to see the look on other tree hunter's faces when they find a new height champion. I like to share the excitement and thrill of new discovery.

When I explore, I usually do not find any champions. But this time I led other explorers in to a really juicy pine forest. I doubt 264' is the tallest sugar pine in the "YNP-Hot Zone"

Michael Taylor



Sugar Pine Cone

G.B. Sudworth. Provided by [National Agricultural Library](#). Originally from [US Forest Service](#). 1927.

G.B. Sudworth @ USDA-NRCS PLANTS Database

Evaluation of Laser Rangefinders

by **KoutaR** » Fri Oct 05, 2012 7:57 am

NTS, There is a laser rangefinder comparison here:

<http://www.fs.fed.us/eng/pubs/pdf/10191803.pdf>

Thanks to Karlheinz for finding and telling me about it!

Kouta Rasanen

Re: Evaluation of Laser Rangefinders

by **dbhguru** » Fri Oct 05, 2012 9:55 am

Joe, Kouta, et al, I've read through the laser test report and find it valuable. I am puzzled at why they chose the HD (horizontal distance) return from the products tested if what they were testing the accuracy of the laser to measure distance to the target. The SD mode would have been more appropriate for that since the tilt sensor must be used to get an HD return, and tilt sensors (degrees in the vertical plane) tend to be less accurate than the laser distance measurements. Nonetheless, for comparative purposes, the tests are useful. I'll have more comments on the tests and what one might glean from them later.

There are several kinds of tests that I conduct. Type 1 test is under "laboratory conditions", i.e. a highly controlled test environment to check the accuracy of either the laser, tilt sensor, or the combination. Type 2 test checks the accuracy of either the laser, tilt sensor, or the combination in ordinary field use and for a variety of target types. Type 3 test looks to find patterns for a particular instrument such as weakness at certain distances or lighting conditions. Type 4 test looks to find ways to get the most out of an instrument for the range of field conditions one encounters. This last class of test is much more

involved and takes into consideration what has been learned from the other type tests. It takes into consideration all the field challenges one encounters, e.g. clutter, greater distances, changing light conditions, distinct/indistinct target construction, etc. If you are going to own a \$1,700 instrument, how do you get the most out of it?

Robert Leverett

Re: Evaluation of Laser Rangefinders

by **KoutaR** » Sat Oct 06, 2012 2:12 am

dbhguru wrote: With a three-point hypsometer such as built-into the TruPulses and Nikon Forestry 550, you shoot to the trunk, take the angle to the top, followed by angle to the bottom, and then the hypsometer gives the result.

Joe & Bob, A small correction: Nikon Forestry 550 does not have a three-point hypsometer function, but its successor Nikon Forestry Pro does.

I agree with Bob that they should have tested SDs and tilt sensors separately. I guess the reason for choosing the HD is that distances are easy to verify with a measuring tape but angles much more difficult.

Bob, I remember I have read your rangefinder comparisons on the ENTS-BBS or on the old Google Group, but I cannot find them now. Could you provide some links here?

Kouta Rasanen

Re: Evaluation of Laser Rangefinders

by **M.W.Taylor** » Tue Oct 09, 2012 12:56 pm

The biggest problem I see with these forestry lasers such as Trupulse, Impulse and Nikon 550 Forestry is the manual itself. When used NOT according to the manual you can get excellent height estimates. However if you follow the manual instructions for the Ht-Subroutine you might get dismal results. This would especially be the case if you are close to the tree and it's a tall one and you are taking the Hd component to the edge of the trunk.

The LTI Impulse and Trupulse series and also Nikon 550 manuals show their corresponding height function diagrams where you are taking the baseline (the horizontal distance) to the trunk in one of the three inputs. This is all wrong. This Hd measurement should be taken to the top leader of the tree, not the trunk. To shoot any part of the trunk for the Hd component is to assume the top is directly above the trunk's edge. In most cases with trees the top overhangs the trunk's edge and you will over-estimate.

Why not just take the Vertical distance component from the Nikon's side display to the top and then base (internally computed with the Sine method) and add them together ? This is only a two step measurement, not three like the Ht-Subroutine, and you get better height estimates due to lean of tree already being calculated.

If you are close to the tree and the tree is tall you will get extreme height over-estimation with the Ht-Subroutine when used according to the manual.

Below is a recent case study of BLM foresters who claim to have found the tallest douglas fir in Oregon recently. (They shoot the side of 250'+ trees from 120 feet away while using the Height subroutine and get 70+ degree angles).

When you shoot a tall douglas fir from 120' away you are hitting side leaders, not the top. These side leaders over-hang in almost all cases, sometimes by 20-30 feet or more. This means your baseline is 20-

30+ feet over-estimated at 120' away. The error here is potentially gargantuan!

In 2011, a group of BLM contract foresters claim to have found a 334' douglas fir in Coos County Oregon..measured it from two sides and got similar figures of 334 feet.

During measurement, they were 120 feet away and the tree was 334' tall. This means their angle to the top was over 70 degrees !

At high angles, the tangent function goes parabolic so any angle error is amplified exponentially. Just get out a calculator to see what I mean.

$\tan(70 \text{ degrees}) * 120 \text{ ft} \approx 329 \text{ ft}$

$\tan(71 \text{ degrees}) * 120 \text{ ft} \approx 348 \text{ ft}$

at lower angles the changes decrease rapidly.

$\tan(40) * 120 \approx 100 \text{ ft}$

$\tan(41) * 120 \approx 104 \text{ ft}$

The 334 ft douglas fir claimed by BLM foresters was actually about 274 ft tall. They were off by over 50 Ft using the best forestry laser in the world, the Impulse200LR. The problem is they followed the manual. They hit over-hanging leaders and assumed they were hitting the top. And they assumed the top was directly over-head the trunk's edge.

$\tan(70) * 100 = 274 \text{ ft}$

That 20 foot base-line error ended up turning into a height over-estimate of 60 feet !

Michael Taylor

WNTS VP

California Big Trees Coordinator

<http://www.landmarktrees.net>

Re: Evaluation of Laser Rangefinders

by **dbhguru** » Tue Oct 09, 2012 3:35 pm

Michael, Good discussion. We've made these same points many, many times in the past. What forever surprises me is why the shortcomings of the 3-point tangent method that is built into the hypsometers and the potential disaster of short baselines for tall trees is not readily apparent to timber professionals, be they field foresters, loggers, timber cruisers, forestry academics, etc. What are they looking at? They can move back from a tall tree, same as we can, keeping their eye on what they might have first thought to be the top and see if it is, in fact is, or the extension of a limb or branch in their direction. It isn't rocket science.

I think the mental image of a tree as basically a trunk with some fuzz at the top is so ingrained that it overrides what would otherwise be obvious. I'm pretty sure that there are plenty of foresters out there who do get it, but can't do much about the lethargy. Unfortunately, the laser manufacturers bought the shortcuts, and now we in NTS have a steeper hill to climb. It is what our advanced tree-measuring workshops are all about. However, to put the situation into perspective, there are probably ten million other examples of such professional myopia. I'm sure other professions could contribute examples of the institutionalized dumbing down of their measurement procedures for the sake of expediency.

Robert T. Leverett

Re: Washington Grove City Park, NY

by **greif** » Thu Oct 04, 2012 12:44 am

RE: possible old growth , Rochester NY area
I forgot, I have some photos of the Powder Mills Park area I am talking about in the previous post at; [http://www.powdermillspark.com/bigtreea ... index.html](http://www.powdermillspark.com/bigtreea...index.html)
The hilltop/ravine area has 3 or so oaks around 4- 4.5 ft dia, lots of 2 and 3 ft diameter oaks.

Gary Reif

Re: Washington Grove City Park, NY

by **tomhoward** » Thu Oct 04, 2012 7:59 pm

Gary, Ever since you posted about the oak grove in Powder Mills Park in 2009, I've been wondering about that site. It looks like an old growth oak grove, a forest type that is extremely rare in upstate NY.

Thank you very much for reviving this topic on the Bulletin Board. I definitely want to come out there, and see this grove. From your description this is old growth, and 187 years (the ring count you got on a cross-section from a fallen oak) is an old growth age in both the Syracuse area (where I live) and the Rochester area. I'd like to get out there this fall, but I don't have a car, so I'll probably take a bus to Rochester. I'll be out of town this weekend, so I'll call you next week. Thank you for giving me your number.

Tom Howard

Re: NTS Partnerships

by **tsharp** » Wed Oct 10, 2012 10:08 am

Bob, NTS:

Some of agencies I have interacted with on tree measurement include the following:

Ohio River Islands National Wildlife Refuge
North Bend State Park
New River Gorge National River
Gauley River National Recreational Area
Monongahela National Forest
WV Nature Conservancy
City of Parkersburg-Parks
City of Vienna- Parks
Blennerhassett State Historical Park

Turner Sharp

Cathedral Pines of 7th Lake, NY

by **tomhoward** » Wed Oct 10, 2012 7:29 pm

NTS, On the cold mostly cloudy afternoon of Oct. 6, 2012, some friends and I explored this glorious old growth grove. I spent the weekend of Oct.6-7 with them at their place in Old Forge. Cathedral Pines is on the left side of NY 28 east of Inlet – a beautiful drive from Old Forge with views of lakes (the Fulton Chain of Lakes) with pine-clad shores, past an island in 7th Lake with old windswept White Pines (that Bob Leverett photographed in 2011).

From the west on NY 28 Cathedral Pines is an awesome sight of about 12 sky-piercingly tall massive rough-barked windswept White Pines soaring high above a hilltop, these great old Pines easily 50-80 ft. above the surrounding forest canopy. Cathedral Pines is a small grove with most of the big trees covering only about an acre of the grove that covers at most 3 acres. We spent an enchanting hour and a half exploring the Pines. A most wonderful fragrance of Pine mingled with the freshness of wet newly fallen hardwood leaves permeated the air. The

ground was carpeted with freshly fallen brown needles from the towering ancient White Pines. The White Pines are a magnificent sight, with rugged trunks rising 60 ft. or more to first branches. Their massive trunks have little taper, and all 12 of these great densely packed White Pines average 40"-50" dbh. Since it had stopped raining a few hours before, the ground was slippery, and the uneven terrain was a little too treacherous for stretching the "D" tape around the trees to do measurements. But I did (with the enthusiastic assistance of my friends) do some heights measurements using the NTS method. Some of these shots were straight up shots so heights are "not less than". I could find only a few level spots where I could sight the trees from base to top, and, since I could not see the tops of the trees, the heights listed below are lower than the actual heights of the trees.

All heights are in feet.

White Pine straight up shot	129+
White Pine	112.8+
White Pine	104+
White Pine	130+
White Pine	117.9+

All these White Pines are massive, over 40" dbh, and up to 300 years old.

We also saw the monument to Lt. Blue, shot down over France in 1944, next to the broken snag stump of what used to be the grove's biggest tree; we found the log of this tree stretched out for a long ways along the ground.

We noticed a tall battered and solitary White Pine across NY 28 from Cathedral Pines. I got a good shot to the tree's top, but I could not see the base (I got a distance of from 58-78 yards into the brush near the tree's base with the 78 yard figure the most accurate - the top of the tree was 99.5 yards from my eye level). It is a very tall tree and I got a height of roughly 140-143 ft.

I also measured a very tall (for the species) slender Balsam Fir in the lower part of Cathedral Pines to a height of 85.6 ft.

In a swampy area to the west of Cathedral Pine is a tall Red Spruce – I got an estimated height of about 100 ft. on this tree, not being able to see the base.

Trees of Cathedral Pines:

Dominant: White Pine

Associate: Hemlock, Red Spruce, Balsam Fir, Beech, Sugar Maple, Red Maple, Striped Maple (Sidney was enchanted with the large yellow Striped Maple leaves)

On Sun. Oct. 7, 2012, we went to Raquette Lake, and explored the magnificent old growth Raquette Lake Red Pines (see report on this grove); since Cathedral Pines is on the route to Raquette Lake, we passed Cathedral Pines twice, first on our way out of Old Forge, and then on our way back to Old Forge.

Tom Howard

[Raquette Lake Red Pines, NY](#)

by **tomhoward** » Wed Oct 10, 2012 7:36 pm

NTS, My friends from Old Forge and I explored this beautiful old growth grove Sun. Oct. 7, 2012, a cold windy day with increasing clouds, but with some glorious autumn sun. The Red Pines have reddish artistically beautiful platy bark composed of jigsaw puzzle-like scales, and this platy bark has a papery feel. When the sun came out, streams of silvery light shot out from the long needles of the Red Pines, illuminating the grove. Most of the Red Pines (and there are possibly 100 or more on the slope above Raquette Lake's marshy South Inlet) seem to be about 150 years old, but a few of the trees near the bottom of the slope look far older with smoother bark, twisted crowns, and one of these older-looking trees has a prominent fire scar. Mixed in with the Red Pines and on top of the hill above them are several much larger White Pines (over 40" dbh and up to 120 ft. tall), and these White Pines are about 200 years old. The ground was covered with freshly-fallen brown pine needles; old growth pit and mound topography is highly developed, more than in most sites I've been to. We all loved this grove, and we spent possibly 2 hours exploring it. We got some

good height measurements with the NTS method (use of sine function, etc.) as we had clear sight lines from base to top on several trees.

Trees measured (all heights in feet):

Red Pine	97.9
Red Pine	90+ (couldn't see base but got close)
Red Pine	104.8 – rising out of hollow
Red Pine	105.6 – rising out of hollow, slender tree, tallest Red Pine - found by the 10-year-old daughter of my friends, who has the makings of a future ent
Red Pine	94.4 – on hill
Red Pine	94.7 – old gnarled tree near slope bottom – could this be the 320-350-year-old Red Pine cored by Neil Pederson? Next to it is the old Red Pine with the fire scar.
Red Pine	94.1

Most Red Pines in this stand seem to be about 90-97 ft. tall. The 105.6 ft. tree Sidney found seems to be the tallest Red Pine.

Red Pine	20.9" dbh
Red Pine	21.5" dbh – typical diameter of big ones

White Pine	111.8
White Pine	119.5 – tallest tree measured

Age data (all White Pine):

log cross-section from high in crown 140 rings, 11" radius

Some people made a campfire pit, and carved chairs out of a fallen White Pine log – I counted about 180 rings on one of the makeshift chairs, 9" radius.

Dominant Trees: Red Pine, White Pine

Associate: Balsam Fir, Red Spruce, Hemlock, White Cedar (mixed in with Red Pines, small, not over 50-60 ft. tall), Red Maple, Sugar Maple, Striped Maple, Paper Birch, Quaking Aspen, Bigtooth Aspen (these last 3 near edge by NY 28)

Tom Howard

Re: Raquette Lake Red Pines, NY

by Neil » Wed Oct 17, 2012 8:47 am

it could be the same tree, Tom. It has been years since I sampled in that stand. David Barclay of SUNY Cortland also sampled that stand and got the same ages we did. I can finally confirm the ages: of 20 red pine I cored, all but one essentially date to the late 1840s at coring height, ~1 m above the forest floor. The oldest tree dates to 1644.

That is a really cool stand, huh Tom?

Neil Pederson

Holland Patent Cemetery, NY

by tomhoward » Sat Oct 09, 2010 8:34 pm

ENTS,

Holland Patent Cemetery, Holland Patent, Oneida County, NY

Jack Howard and I made 2 visits to this idyllic old cemetery which has been in operation since about 1791. What follows is the report from the first visit on 9/11/2005:

In the midst of this cemetery is the largest White Pine yet seen in central NY, a mostly open-grown tree with a huge trunk supporting 5 great ascending limbs – it's the largest White Pine I've yet seen in NY. The tree (in 2005) has a dbh of 57" or cbh of 14.9 ft. The lowest branches are about 20 ft. up and I looked at the stump of one of these branches and estimated about 80 rather wide rings – this could give the tree an age of 200-250 years. Even the smallest branches have rough bark which on White Pine is a sign of aging. We were awed by this great pine; in fact, I have only seen 2 White Pines larger than this in my entire life –

a tree on Vermont Rt. 313 (southwest part of state) in 1974 over 6 ft. dbh and with a plaque saying it was the model for the VT State Seal of 1798; the

tree had fallen before 1978

a White Pine on Rt. 213 on the central Maine coast which we measured at 15'3" cbh in Aug. 1970; another great White Pine measured in Aug. 1970 on old U.S. 1 near Nobleboro, ME had cbh of 14'5" – all these immense New England pines were open-grown.

The Holland Patent White Pine appeared to be 85-90 ft. tall – I paced its shadow (in early afternoon sun) to 93 paces, so I assumed it was under 100 ft. tall. As will be seen, I vastly underestimated the tree's height.

Some old gravestones (dated back to 1802 or earlier):

1 to right of great Pine – Mary E. Easland d. Oct. 24, 1844 – age 11 yrs., 3 months

2 Samuel Church d. Nov. 30, 1842 age 83 yrs., 5 months, "A Patriot of the Revolution"

3 Joseph Holstead DAR monument 1903 d. Feb. 13, 1845 age 86 yrs.

4 Simeon Willard Soldier of Revolution d. 124 age 80 yrs.

5 Pascal C. I. De Angelis age 75 yrs. d. Sept. 8, 1839 Rev. War soldier DAR, "Thanks be to God who giveth the victory through Lord Jesus Christ"

6 Marie Le Moyne de Fayole 1739-1802

7 Charles Le Moyne De Angelis 1815? – 1903?

8 "In memory of Mr. John Woodbridge who was killed by the fall of a Tree – May 10, 1804 Age 22 (?) We mourn the sudden swift remorse from each & all enjoyment here when Christ commands we must obey without a murmur or a tear" ("s" looks like "f")

9 Seth Johnson of City of NY Merchant b. Middleton CT Nov. 28, 1767 died while on a visit to this place Dec. 8, 1802

10 Amos L. Hubbard age 12 d. Nov. 8, 1806

11 Mary Conde D. Apr. 29, 1806 11 yrs. old

12 Roderick Hopkins d. Nov. 3, 1841 age 84 yrs. "He was a Soldier of Christ and Patriot of the Revolution" Also measured thorny Honeylocust 39" dbh (10.2 ft. cbh)

In the Local History and Genealogy Dept. of the Onondaga County Public Library in Syracuse, NY where I work is a book on Holland Patent and an old undated picture (looks like before 1900) shows the great White Pine as a large tree.

Jack and I next visited Holland Patent Cemetery

9/25/2010 and this time I had the Forestry 550 Laser Rangefinder with me. The great White Pine was still standing but had declined in health considerably since 2005. It is still a glorious sight but it has suffered storm damage with bark peeling on some limbs, and there is a lot of damage to the base with big scars and many woodpecker holes; the huge trunk sounds hollow. I measured the trunk at 57.5" dbh (15.1 ft. cbh). The height of the pine surprised me as I got 116 ft. for the highest twig, far higher than I imagined in 2005.

I also measured a large European Larch high on the cemetery's hill at 90 ft. tall.

A grove of trees on a steep hill at the back of the cemetery surprised me as they did not look very tall. I measured a White Pine at the left edge (facing hill from cemetery) at 103 ft. tall, and 2 other not so tall-looking White Pines to the right turned out to be even taller with one farther right 117 ft. tall, and to the right of this pine, a White Pine with 2 ascending leaders (looking like 2 trees) 120 ft. and 124 ft. tall left to right – this is the tallest tree I've measured in NY so far, and the tallest White Pine I've seen in central NY. I looked at the tallest tree closely and saw that its rough-barked trunk is easily over 40" dbh. This hillside is a small secondary old growth grove dominated by tall White Pine and smaller Sugar Maple, Black Cherry.

2 European Larches just behind the tallest White Pines were 109 ft. and 106 ft.

Trees measured:

great White Pine	116 ft.	15.1 ft. cbh
European Larch	90 ft.	

On hillside:

White Pine	103 ft.
White Pine	117 ft.
White Pine	124 ft.
European Larch	109 ft.
European Larch	106 ft.

Tom Howard 10/9/2010

Will Blozan wrote: What a great, huge tree with lots of history- thanks for the detailed report. Can you get a photo? I am wondering how a tree with ~80 fast-growing ring years on a branch 20 feet up could be

200-250 years old? Did I misinterpret your wording? To me, this would suggest the tree is very young, ~100 years. Just curious.

Will, The big pine appears in an old photograph, but the age of the photo is uncertain; it could be from as late as 1930, so it is extremely possible that the tree is under 200 years old. Pines usually grow slower in our colder climate and I probably underestimated the number of rings on a branch stump 20 feet over my head. In 2005 I guessed an age of 200-250 years, but it is possible that the pine is less than 150 years old.

As far as photos are concerned, I plan on sending one soon. I do not have a digital camera; all the pictures I take are with disposable cameras and the latest pictures of the pine are still in the camera. I misplaced the pictures I took in 2005. I can convert pictures to jpegs, but I am still learning how to make them small enough for the BBS. When I figure that out, I'll be sending several pictures of the trees of central NY to the ENTS.

Tom Howard

[Re: Holland Patent Cemetery](#)

by **Will Blozan** » Sun Oct 10, 2010 2:24 pm

Tom, I am not convinced that white pine grows more slowly "up north" than elsewhere in its range. Jess Riddle has some incredible growth rates from the Adirondacks he may post about and the ones I have been climbing in western Mass are young and HUGE. This would be a good theory to test with volume modeling of big pines of known age and similar sites throughout their range. I suspect that there will be little difference in growth rates between say NY and the s. Apps.

Will Blozan

Re: Holland Patent Cemetery

by **tomhoward** » Mon Oct 11, 2010 9:38 am

Will, This is fascinating. White Pine is a tree I've studied most of my life and it still has its secrets, its mysteries. I'd like to see Jess Riddle's data on White Pine growth rates in the Adirondacks. White Pines here in North Syracuse grow quite slowly; pines the same age as the huge young trees in western MA are smaller here. The largest White Pine in the North Syracuse area (and the largest I've ever seen in Onondaga County), a great open-grown tree, that stood on North Syracuse Cemetery property till falling in 1979, had a cbh of 10'2" and was close to 300 years old; I counted 270 rings on a cross-section of the largest limb (couldn't count rings on the stump as it was rotten inside). It was a tree I knew from childhood, a craggy old monster with the spread of its great limbs nearly matching a height which I believed to be about 90 ft. Before the BBS was developed, I posted a picture of this tree and its environs to the ENTS site.

Any project involving the relationship of White Pine size and age is fascinating.

Tom Howard

Re: Holland Patent Cemetery

by **gnmcmartin** » Mon Oct 11, 2010 2:52 pm

Will and Tom: White pine growth rates are a complicated subject. I agree with Will about southern and northern white pine growth rates--they can be generally similar. But there are some complicating factors, the easiest of which is site, including soils.

The really complicated part is the strain of white pine involved, and it may not be as simple as having native strains growing best in their native areas. There have been a number of provenance trials done for white pine provenances in different areas. I have

seen a few of these, but I am sorry I don't have a bibliography. And random observations in different areas can lead to some false conclusions. One problem leading to those is that white pine growing in any specific area, such as Syracuse, may not be from local seed sources, and/or if they are, local "native" seed sources may not be the best for the area. White pine seed has been commonly collected in one area and then planted in another. It is all quite complicated.

One of the complicating factors could be how an area was repopulated with white pine after the most recent glaciations--where did the new populations migrate from? In Scandinavia there is a very dramatic example of this with Norway spruce. One part had Norway spruce migrate back in from the east with a very slow growing strain, while to the west a much more robust strain coming from another direction was responsible for the repopulation. Take the more western strain and plant it to the east, and it will outgrow the native population there dramatically. So....

The most dramatic example of a non-native strain outperforming a native strain I know of is a stand near Parsons WV. Here a grove of white pine with a seed source near Asheville, NC is spectacularly outgrowing all the other white pine in the area. But just as often, a native strain will outgrow any others that can be found. One of the provenance trials done by Professor John Genys a number of years ago at UMD got that result in a Maryland trial.

So, take any observations about how any white pine is growing in any one area as more than likely meaningless as far as any general conclusions that can be drawn from it.

Gaines McMartin

[Re: Holland Patent Cemetery](#)

by **Will Blozan** » Mon Oct 11, 2010 6:03 pm

Gaines, Thanks for weighing in here. I assume- perhaps wrongly- that everyone will interpret my posts about white pine a discussion of native trees/strains. Further deliberation and study would have to focus solely on native strains- assuming we can assume that...

Many of the pines at the Biltmore Estate in Asheville, NC came from Maine via Germany in the 1890's. From what I understand they are of the "Weymouth" strain selected for mast spars. Indeed they are handsome trees very clean in bole and slowly tapered. But down here they max out around 145' whereas the native pines have been measured to 157' and far larger (again, assuming a native strain and similar age). Likewise, in the Cataloochee District of GRSM the CCC corps planted heinous white pines from an unknown to me origin. They suck. Full of large, persistent branches and poor form. In contrast the native pines on nearby slopes stand out and are easily recognized by their clean boles and towering height. I suspect the gene pool now has muddy waters...

I'm with ya on the genetics, site, and provenance thing. It does complicate things a bit.

Will Blozan

[Re: Holland Patent Cemetery](#)

by **tomhoward** » Mon Oct 11, 2010 7:54 pm

Gaines, You hit the nail on the head about the complicated subject of White Pine genetics. I agree with Will, and I also am with you on genetics, site, provenance.

It is entirely possible that the native seed source of White Pine in North Syracuse at least does not have

the best growth characteristics for the area. It's a good question where the seed source came from after glaciation.

Tom Howard

[Re: Holland Patent Cemetery](#)

by **gnmcmartin** » Mon Oct 11, 2010 8:14 pm

Will: Interesting about the Weymouth strain being planted on the Biltmore estate. I have no reason to think that the pine planted near Parsons WV is the Weymouth strain originally from Maine, but it could be. That stand was planted somewhere near 1935 and the record of the source simply says Asheville, NC, as far as I know, but I haven't seen the actual record of the source. When were the pines planted on the Biltmore estate? Would they have been old enough in 1935 to be a likely seed source? The record saying Asheville may simply refer to a Forest Service office or the sending point of the person that collected them.

But here may be one thing that could point to the Weymouth strain--these are the straightest growing damn white pines I have ever seen. I mean STRAIGHT, like they might have been turned on God's own cosmic lathe! I visited the Biltmore estate a few years ago and liked the pines there, but I don't remember being so stunned by their absolute straightness. Now maybe I was just not focusing at that point--I was there to see the house and gardens, etc. And the Parsons, WV pines seem, and I say "seem" to be a bit faster growing. Elevation at Parsons is something like 1,500', somewhat lower than Asheville and most of that area. Soil mostly bottomland along a stream--at least a very good class II site.

Anyway, I would love to have your reaction to what I am describing here--what value, if any, does my report of the straightness of these WV pines have in guessing the provenance, Biltmore/Weymouth or much broader general Asheville area? And does the date of the planting in WV answer the question?

As for reasonably large natural white pine stands, I would assume that any "pollution" from nearby individual trees, or even plantations, of some other seed origin, should be minimal. But I really don't know.

Perhaps someone has studied that kind of thing. As for what you say here: "In the Cataloochee District of GRSM the CCC corps planted heinous white pines from an unknown to me origin"--I have seen something similar in a state forest here in MD. There is one place where there are white pine that was planted in the early '40's next to some Norway spruce plantings. God, I don't know where that seed came from--they are terrible white pines, not half the size of the Norway spruce, and crooked and sick looking. No trees I have ever seen demonstrate to me the importance of having the right seed source for white pine plantings.

--Gaines McMartin

[Re: Holland Patent Cemetery](#)

by **edfrank** » Mon Oct 11, 2010 11:34 pm

Tom, is this the right cemetery? [Yes]

<http://www.usgwarchives.net/ny/tsphoto/oneida/hollandpatent.htm>



<http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=296395>

Is the tree visible on the photograph, or is it someplace else?

[Re: Holland Patent Cemetery](#)

by **tomhoward** » Wed Oct 10, 2012 7:21 pm

NTS, On the weekend of Oct. 6-7 I traveled to Old Forge with some friends who have a house there. On our way to Old Forge on NY 365 on Sat. Oct. 6, we visited Holland Patent Cemetery where the largest White Pine in central NY grows. I used the equipment Ed Frank of NTS loaned me, along with my scientific calculator (to use sine function for NTS method) and I measured the following trees:

White Pine in grove behind cemetery	113.6 ft.
White Pine in grove behind cemetery	120.7 ft.
– this double-trunked tree is the tallest White Pine in central NY (on 9/25/2010 I measured the right tallest trunk to 124 ft. with Robert Henry's Forestry 550 laser rangefinder – on 10/6/2012, I got what I believe is a more accurate measurement of 120.7 ft. from this same trunk).	

White Pine, the great champion tree	112.3 ft.
57.5" dbh	

As on 9/25/2010, we saw a Vulture soaring over the top of this tree. The great Pine seems to be dying, with big dead limbs in crown, but it is still hanging on to life. My friend's 10-year-old daughter found the whimsically-shaped jigsaw puzzle-like scales of rough bark on this tree to be enchanting.

Tom Howard

Weminuch Spruce, CO

by **jamesrobertsmith** » Tue Oct 09, 2012 6:07 pm

Sometimes we'd walk through groves of big spruce trees. Not monsters, but nice, stout trees.

We encountered this particular grove in close proximity to this abandoned mine and miners' cabin.

For what it's worth to those who keep track of such things, this was around 11,200 feet above sea level (or thereabouts).





Re: Chernobyl's de facto Wilderness Area

by **PAwildernessadvocate** » Thu Oct 04, 2012 3:11 pm



<http://www.youtube.com/watch?v=9KH29JFybz8>

Re: Chernobyl's de facto Wilderness Area

by **Joe** » Fri Oct 05, 2012 4:28 pm

jamesrobertsmith wrote: Lesson learned is: Humans suck. The Earth will recover once we're gone (or once we're reduced to a primitive state).

I believe humans will eventually fix their damage to the Earth and get into an equilibrium with it- or, at least I think it's a possibility. It's all kinda miraculous that we've gotten as far as we have and there's no reason to think the "miracles" have ended. I don't say this in a religious sense- only that I think the cosmos is infinitely complex and holds endless possibilities including a healing of the Earth without the end of the "naked apes". This point in time may be just the very beginning of the story.... or maybe not---

Joe Zorzin

Re: Chernobyl's de facto Wilderness Area

by **jamesrobertsmith** » Sat Oct 06, 2012 12:16 pm

Joe wrote: or maybe not---

We're going to burn down the Earth's ecosystems as we have known them. The human-caused Sixth extinction will continue apace until we, too, are gone. It's coming and there's not a damned thing that can be done to stop it. I am wholly convinced of this fact. All you have to do is look at what has happened to Earth since I was a kid. There has been an ongoing, inexorable, and unstoppable destruction of the natural world by humans. If you think that we'll stop burning fossil fuels before the last drop of oil has been pumped out of the crust, or the last chunk of coal has

been peeled out of the rock and burnt, or the final liter of natural gas has been fracked, then you are fooling yourself. The forests will all be felled, their animal inhabitants killed and eaten; the rivers fouled beyond description; the aquifers despoiled; the soil poisoned beyond reclamation.

Sorry to be the bearer of bad news, but I have yet to see one goddamned shred of evidence that this is not the way things are going to end up.

Twenty years from now there won't be a single wild elephant. Tigers will be a fading memory. Wolves will be gone. My son will live to see the last of the great megafauna go down to extinction.

Get out in the forests and wilderness to experience the shreds of nature remaining to us. It will soon be all gone.



Fading glacier. One tiny indication of what we have done to Mother Earth.

James Robert Smith

[Re: Chernobyl's de facto Wilderness Area](#)

by **Joe** » Sat Oct 06, 2012 1:19 pm

Life is tough stuff- some form of life and some form of ecosystem(s) will survive. Not even full scale nuclear war could destroy all life. Then, eventually, it will recover as it did after the asteroid or comet that wiped out the dinosaurs. I think humans and their descendents will be around billions of years from now- though they may be on another planet. The eternal transformation/evolution of the infinite cosmos will continue. The upcoming catastrophes will be just another chapter in the story of life on Earth.

So though it's "bad"- on a larger scale, it's just what is, another experiment on this third rock from our star. Which of course doesn't mean we shouldn't try to stop it from happening- as that's the role of some of us.

Joe Zorzin

[Re: Chernobyl's de facto Wilderness Area](#)

by **jamesrobertsmith** » Sat Oct 06, 2012

Oh, definitely! Life will go on.

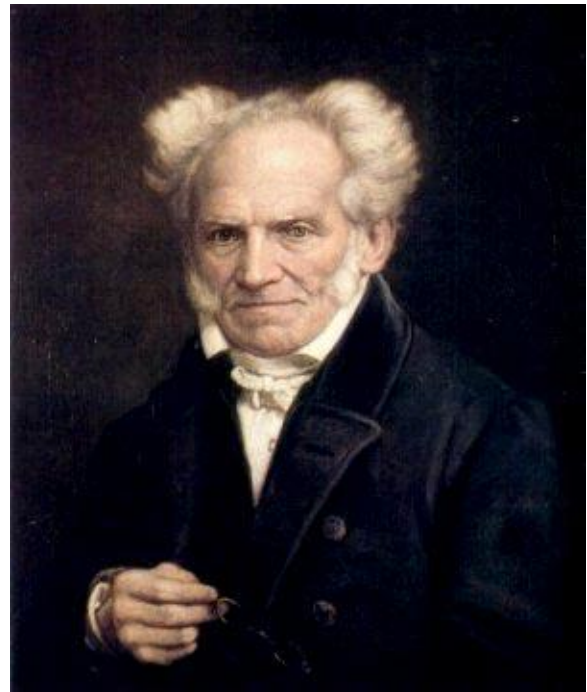
As soon as Man is shed from the system, the things that remain will flourish and diversify. I like to point out that, given time, there is no reason a pigeon cannot become a great eagle; a rat a tiger; a dog a hulking bear; a minnow a huge and stalking shark. The things we leave behind will fan out, fill the niches, and evolve.

It's just that there won't be any humans around to see Earth heal.

James Robert Smith

[Schopenhauer and Nature](#)

by **RyanLeClair** » Wed Oct 10, 2012 8:31 pm



Painting of Arthur Schopenhauer (February 22, 1788 – September 21, 1860), German philosopher

Recently I muddled through twenty-some pages of Arthur Schopenhauer's "The World as Will and Representation"--I would have liked to have read the whole tome, but philosophical treatises have never given me great pleasure. They strike me as fascinating from afar, but once I have delved into them, I magically lose interest. Anyways, what precious little I did read had much to do with beauty--specifically, the beauty of the natural world. In Schopenhauer's worldview, there is such a thing as the Platonic Ideal. That is to say, every object in the world inspires in the viewer an idyllic representation of that object. Say one of us were to look upon an chair; immediately, our consciousness would conjure up an image of the "ideal" chair, an image synthesized from every chair we have ever seen or thought about. This is the Platonic Ideal. It is an eternal and transcendent cognition.

When we look upon a tree, so says Schopenhauer, the Platonic Ideal overwhelms our thought--we imagine

the ideal tree. In that way, the beauty of said tree is partially in the mind observing it (a la David Hume). So if Schopenhauer were still around, he would postulate that our fascination with trees actually stems (ha ha!) from the Platonic Ideal.

Schopenhauer was a pessimist through and through, indeed the first of the German Idealists to stray away from optimism. He saw the lives of mortal creatures as overwhelmingly painful and frustrating. The misery of existence, so he says, can be ameliorated by seeing the Platonic Ideal in nature; for in the Platonic Ideal we behold something transcendent. Schopenhauer was an extremely morose individual, so his view of reality might have been a little skewed.

Ryan LeClair

[Great Old Broads Pine on Broad Brook, MA](#)

by dbhguru » Thu Oct 11, 2012 12:06 pm

NTS, On the day before the big Oct 12th event, Dr. Joan Maloof, Monica, and I took a walk up Broad Brook behind our house to visit the huge double pine that I keep careful measurements on. On the way we saw sassafras leaves and looked up.



Here is a beauty on the forest floor. Love those leaves.



Monica and Joan next to a large white pine.



And now, the huge double. Depending on where one sets the base, the girth is between 14.8 and 15.2 feet. An average of 15.0 feet is reasonable. Now to the height. The tree has broken the 140-foot threshold. It is 140.2 feet tall. Will Blozan measured this fine tree in Oct 2007 when I was flat on my back with a bladder catheter enduring the shingles. Now the great pine joins the exclusive Connecticut River Valley of Massachusetts 140-Club. Other members include one white pine on Smith College property, one white pine in Greenfield, MA, one white pine in Mount Tom State Reservation, one tuliptree on the Mill River in Northampton, and one tulip tree in Robinson State Park, Agawam, MA. Six trees altogether, 4 pines and 2 tuliptrees. It's a pretty exclusive club, and the Great Old Broads Pine is within half of a mile of our home. Sweet!



Robert T. Leverett

Tallest California Hardwoods Update:

by yofoghorn » Thu Oct 11, 2012 10:58 pm

Hi everyone,

These are the most current lists of my hardwood discoveries in the past year. Does anyone know if the madrone is perhaps a world record? What is the tallest known madrone tree?

California Sycamores (*Platanus racemosa*) - 140'+
(Updated June 2, 2012)

Height (ft.), DBH (ft.)

178.20', 3.93'

169.10', 4.03'

164.33', 2.57'

156.28', 5.89'

155.6', 4.59'

154.8', 3.85'

150.6'

148.8', 2.76'

148.2', 2.92'

148.0', 6.03'

146.9'

145.7', 5.06'

143.4', 5.46'

142.7'

142.1'

141.5', 3.39'

140.9'

140.2', 5.94'

Bay Laurels (*Umbellularia californica*) - 150'+

(Updated July 17, 2012)

Height (ft.), DBH (ft.), Location

165.33', 4.38', Roaring Camp

158.87', 2.02', HCRSP

155.5', 3.13'

154.0', 2.71'

150.5', 6.53'

150.5', 1.70'

150.0', 2.39'

Tanoaks (*Notholithocarpus densiflorus*) - 140'+

(Updated July 14, 2012)

Height (ft.), DBH (ft.), Location

162.02', 2.33' - FNMSP

158.09', 4.03' - BBRSP, large single stem

157.3', 2.60' - FNMSP

153.87', 2.87' - BBRSP

150.9', 4.22' - FNMSP, triple standard

150.5', 2.10' - Huddart County Park

150.5', 2.79' - BBRSP

150.0', 3.65' - FNMSP, double standard

Pacific Madrones (*Arbutus menziesii*) - 130'+

(Updated March 13, 2012)

Height (ft.), DBH (ft.), Location

135.4', 2.41', FNMSP

Zane J. Moore

[Re: Tallest California Hardwoods Update:](#)

by **M.W.Taylor** » Fri Oct 12, 2012 5:40 pm

Zane, Your rate of discovery on these tall western hardwoods is simply astounding ! Not just the rate of new discovery but also the amount of height increase between new records. For example: 50 ft increase from old height record to new height record for California sycamore (*Platanus racemosa*). Tallest known California sycamore was about 128" until you started measuring trees with laser only a few years ago.

I wish I could click the like button one time for each new record tree on the list you provided, but the system will not allow that. Thanks for the report Zane. I look forward to seeing your future postings here on NTS.

Micahel Taylor

[Re: Tallest California Hardwoods Update:](#)

by **yofoghorn** » Sat Oct 13, 2012 12:49 pm

Rand wrote: Zane, I noticed how skinny a lot of these trees are and wondered how intermixed with conifers they were .

Rand, Many of these hardwood trees were found in second-growth redwood stands. All of the tanoaks, with the exception of those found in Big Basin, were in second-growth stands. The tallest three sycamores as well are in second-growth stands. Most likely these trees started when the redwoods were small and the amount of light was decent enough for the species to survive with. As the redwoods grew, the sycamores and tanoaks had to grow with them. These trees are testaments to the redwood competition factor. The madrone, in fact, is blocked by a redwood downhill and a tanoak uphill, so since curving its trunk one way or the other would not result in more light, the tree was forced to grow straight up and

compete. Trees like the sycamores would likely not get to the 260'-270' range. The tallest tanoak and sycamore trees that aren't competing with second growth redwoods were the 156.28' sycamore which grew in an alluvial flat with sycamores and bay laurels to compete with, and the 158.09' tanoak which grew in Big Basin old growth stands.

Zane J. Moore

[Re: Tallest California Hardwoods Update:](#)

by **Don** » Sat Oct 13, 2012 3:55 pm

Zane-

According to the American Forest Big Tree Registry and CalPoly San Luis Obispo's big tree listing, the madrone point leader is:

88 feet tall, 116 foot canopy
316 inches in girth
433 Points

and was found in Carmel in 2004. Yours is taller if both were measured accurately!

Don Bertollette

[Re: NTS Partnerships](#)

by **James Parton** » Fri Oct 12, 2012 1:40 am

I would say at least to a small extent the Carl Sandburg Home State Historic Site (NC). Will Blozan has done some work with them there and the Park manager there let me measure some trees a couple of years back in restricted areas and assisted me in doing so. She seemed very interested in ENTS work and had heard of our efforts in Congaree and GSMNP.

James E Parton

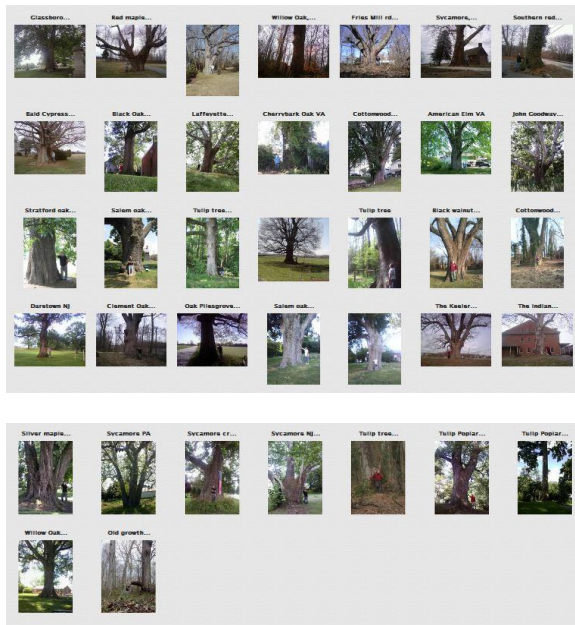
[Big Tree hunter shares his findings...](#)

by **JohnnyDJersey** » Fri Oct 12, 2012 9:41 pm

Hey everyone this is my first post but I've been hunting big trees in NJ, PA, and, VA for a decade now and I wanted to share some photos of my findings. Some trees are well known but some are hidden gems and undocumented so far. Enjoy. I'm on Photobucket under the same name: JohnnyDJersey. Here is a link with just a few trees I've come across...

<http://s299.photobucket.com/albums/mm290/Johnnydjersey/>

John Harvey



[Re: Big Tree hunter shares his findings...](#)

by **JohnnyDJersey** » Sat Oct 13, 2012 9:22 pm

Tsharp, I have measurements for all of them that I will try to post. I have a word spreadsheet listing over 100 big trees I have photographed, measurements, and thier locations. Some of the cbh are in the titles

of the photos. James, I know what your saying. A 20ft CBH tree looks alot like a regular sized tree if no one is standing next to it lol.

John Harvey

[Re: Evaluation of Laser Rangefinders](#)

by **dbhguru** » Tue Oct 09, 2012 3:35 pm

Michael, Good discussion. We've made these same points many, many times in the past. What forever surprises me is why the shortcomings of the 3-point tangent method that is built into the hypsometers and the potential disaster of short baselines for tall trees is not readily apparent to timber professionals, be they field foresters, loggers, timber cruisers, forestry academics, etc. What are they looking at? They can move back from a tall tree, same as we can, keeping their eye on what they might have first thought to be the top and see if it is, in fact is, or the extension of a limb or branch in their direction. It isn't rocket science.

I think the mental image of a tree as basically a trunk with some fuzz at the top is so ingrained that it overrides what would otherwise be obvious. I'm pretty sure that there are plenty of foresters out there who do get it, but can't do much about the lethargy. Unfortunately, the laser manufacturers bought the shortcuts, and now we in NTS have a steeper hill to climb. It is what our advanced tree-measuring workshops are all about. However, to put the situation into perspective, there are probably ten million other examples of such professional myopia. I'm sure other professions could contribute examples of the institutionalized dumbing down of their measurement procedures for the sake of expediency.

Robert T. Leverett

Re: Evaluation of Laser Rangefinders

by **Don** » Sat Oct 13, 2012 4:30 pm

Mike- as a professional forester who has worked for the USFS, the BLM, and the NPS, I can tell you that any forester graduating from an SAF accredited school knows better than to measure the height of ANY tree when seeing the clinometer read 70 degrees.

As a general rule of thumb, foresters are admonished to 'be out AT LEAST as far as the tree they're measuring is up'.

That said, I notice you said "BLM contract foresters".

My personal reflection on contracted employees is that government employees are generally superior, but underfunded and over-extended; whereas contracted employees are seldom accredited and are often overpaid (to offset the lack of benefits offered).

I can't speak to or defend contract foresters...it has perhaps more to do with the knowledge skills and abilities of the agency contracting officer/officer representative, and how the contract is written.

Joe Zorzin has asked, pointedly I'll add as I see his point, why do we need to measure tree heights so accurately. If you and I were to see a USFS/NPS/BLM contract for measuring tree heights to assess champion tree status (how cool would that be!?!?!?) we'd have reason to be measuring to the highest level of accuracy. But the average forester would get fired for taking the time to accurately measure every tree in the forest. The average tree doesn't need it.

Keep up the stellar work Mike, we all aspire to your focus and devotion to the 'dendromorphological cause' !

Don Bertollette

Re: Evaluation of Laser Rangefinders

by **Joe** » Sat Oct 13, 2012 4:40 pm

Don wrote: Joe Zorzin has asked, pointedly I'll add as I see his point, why do we need to measure tree heights so accurately. If you and I were to see a USFS/NPS/BLM contract for measuring tree heights to assess champion tree status (how cool would that be!?!?!?) we'd have reason to be measuring to the highest level of accuracy. But the average forester would get fired for taking the time to accurately measure every tree in the forest. The average tree doesn't need it.

I measure, or I should say guestimate, to the nearest 8 feet. (not to the top- only to the top of the merchantable wood)

But of course that's fine enough for what I do- which is not SCIENCE- for science, it should be as accurate as scientifically possible.

Joe Zorzin

Central Park, NYC

by **Joe** » Thu Oct 11, 2012 11:23 am

I just spent 4 days in NYC including some fine hiking in the southern half of central park. It's a wonderful place with hundreds of gorgeous elms. I know Jenny has uploaded photos and videos from the park so I'll now have to find some of her messages. I have some photos I'll upload when I get a chance.

A dynamite park surrounded by huge skyscrapers-- all rather mind blowing



pushing up bricks



sycamore (or London plane?) growing over curb



unknown species- and my Elizabeth



unknown species. Image Below: elms

Joe Zorzin



[Re: Bushwhack Hits Paydirt](#)

by **fooman** » Sun Oct 14, 2012 4:11 am

M.W.Taylor wrote: Don, That picture has wide angle lens distortion. After you get above the root swell on the "Sugar Tower", the trunk is cylindrical and very high to the first branch. Michael

Don wrote: Michael- The camera angle I'm guessing imparts more taper than there actually is...I'll bet that the bole is amazingly cylindrical with very little taper until after at least the first branch?

-Don

Hi All, There are two methods for correcting for perspective distortion created by objects receding from the camera:

1. Use a camera with built in perspective control,

such as a view camera (the old-fashioned bellows type) or a camera with a perspective control lens, also known as a shift lens (see http://en.wikipedia.org/wiki/Perspective_control_lens). This method is rather expensive, as most view cameras or PC lenses are not cheap!

2. More common these days is to use image processing software to perform perspective, or keystone, correction. It can be simple manual distortion of the image, or semi-automated, using software such as Photoshop or DxO Optics - such software also use calibrated lens corrections to help correct all sorts of distortion. An example of such correction, using the freeware Gnu Image Manipulation Program (GIMP) is at <http://constantphotographer.blogspot.com/2011/07/perspective-control-with-gimp.html>.

The computer I use came with a older version of Photoshop Elements, so PC control is fairly easy. On the assumption that most of the trees are vertical

(except for the small one to the left), I just had to adjust a slider until most of the trees are vertical. This isn't perfect, as the figure at the base shows some distortion, but it does provide a better representation of the bole of the tree. See attached images.

Cheers,
Matt Smilie

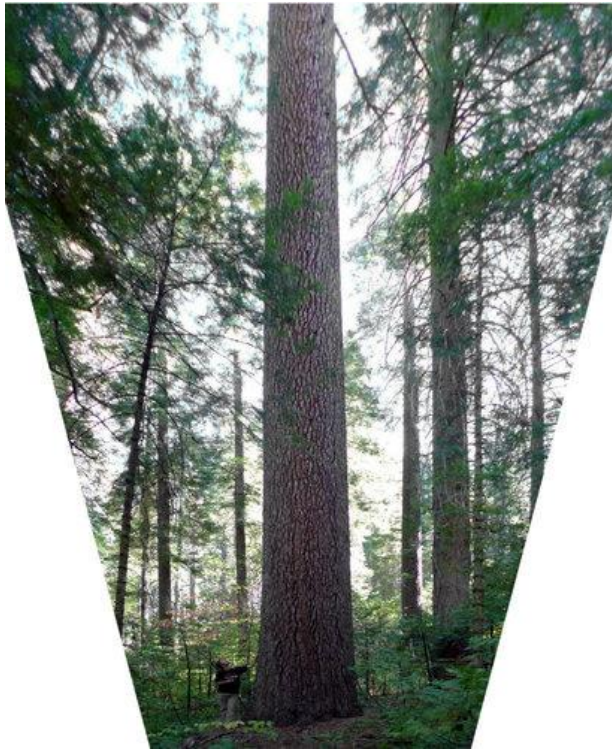


Figure 1: Perspective correction performed on image - note verticality of surrounding trees compared to the original.

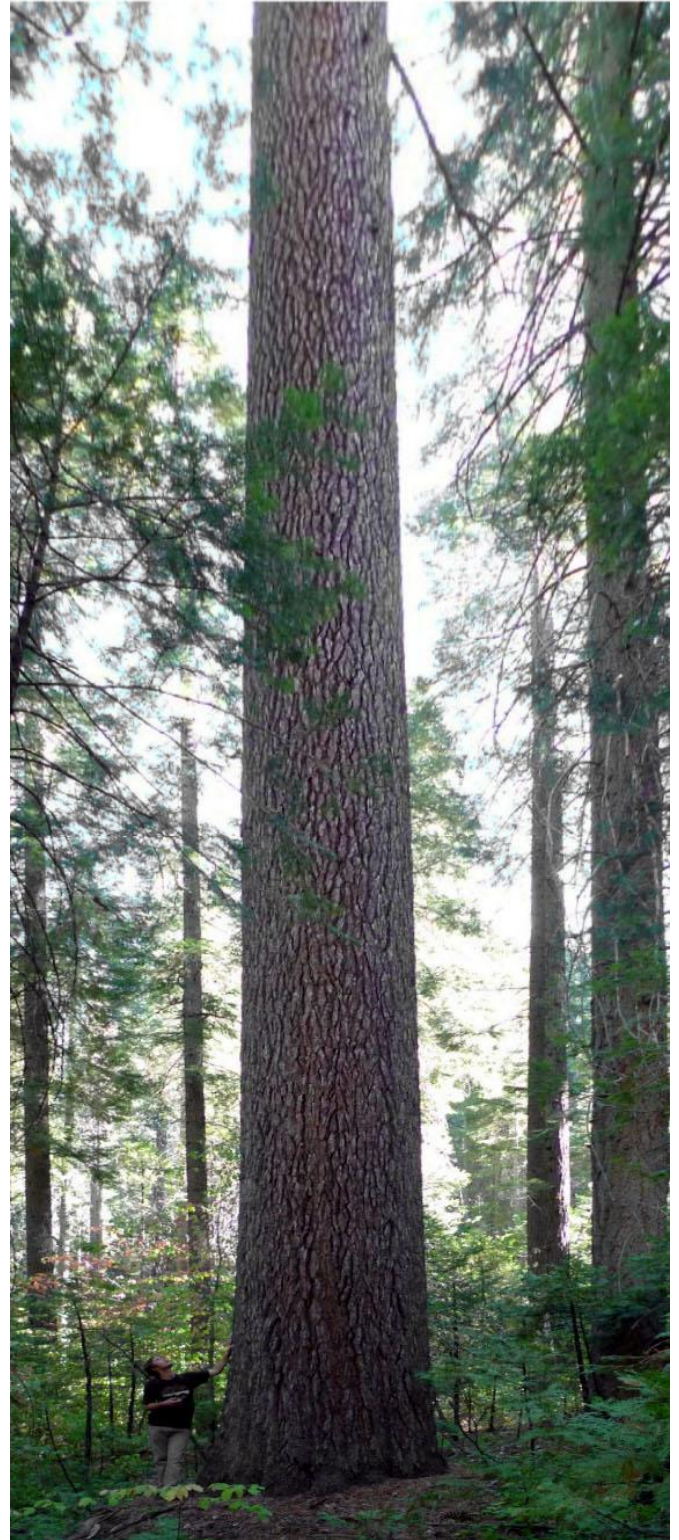


Figure 2: Corrected image, cropped.

[What kind of oaks are these? \(Plus Yo Momma's Big Aspen\) CO](#)

by jamesrobertsmith » Sun Oct 14, 2012 11:40 pm

I kept running into this scrubby oak tree at various places in Colorado. Sometimes the tree would literally grow like a shrub along the ground. In other places the same tree was taller, but not very substantial anywhere I encountered it. What the heck is it?



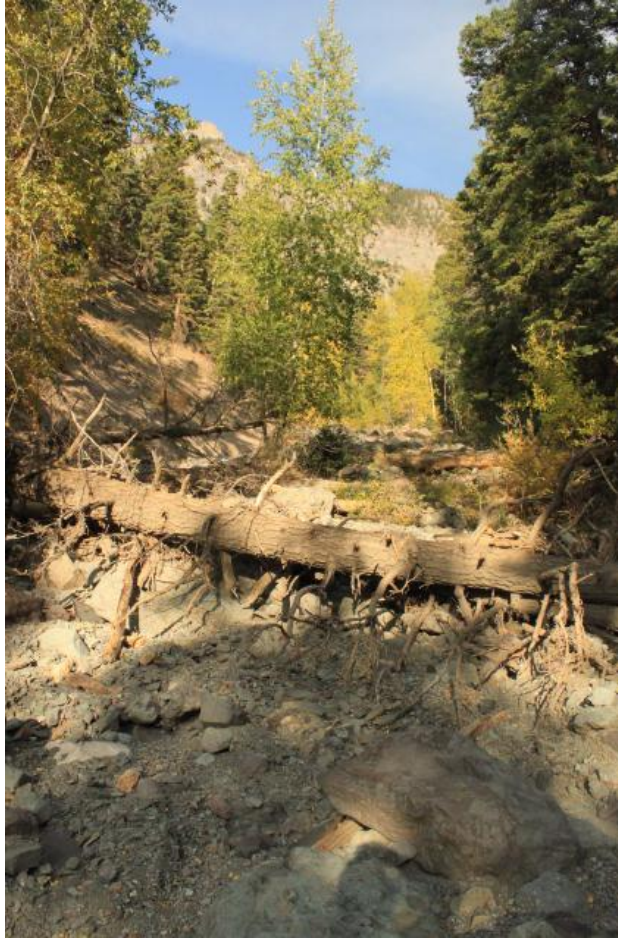
Here was the oak. This was about as large as I saw them get. This was on a trail in the Amphitheater Recreation Area above Ouray.



You want to see big aspens? Hike the trails in the Amphitheater Recreation Area! They were HUGE! I took this one of Andy Kunkle standing beside a really tall, gnarly aspen on the trail.



Here I tilted the camera to show the same tree from base to top. I couldn't back up any further to get a better perspective.



This entire vicinity is volcanic. Lots of easily eroded terrain. What was described to me as "tuff" when I was in Yellowstone. This was one of a number of mud-slide remnants we saw while hiking the area.

James Robert Smith

Re: What kind of oaks are these? (Plus Yo Momma's Big Aspen) CO

by **dbhguru** » Mon Oct 15, 2012 8:38 am

Robert,

Gambel oak (*Quercus gambelii*). They are the common understory oak in the San Juans. They can form dense stands, as you saw.

Robert T. Leverett

Re: Height Sub-Routine No Better Than Using A Tape-Line ?

by **mdvaden** » Sun Oct 14, 2012 11:42 pm

Hi Michael. I relayed what you shared about this, at the tall tree measuring presentation I did in Portland earlier this month.

<http://www.westernforestry.org/Events/p...gy-2012-2/>

Had the 3pm slot. Ha! Only one guy was falling asleep in the front row - lol - most everybody else enjoyed the topic. Anyway, wish you could have been there too, but this was a pretty low key presentation. But appreciated your feedback to help contribute.

M. D. Vaden of Oregon

Re: Height Sub-Routine No Better Than Using A Tape-Line ?

by **dbhguru** » Mon Oct 15, 2012 11:19 am

Michael, Sharing our knowledge with BLM and FS foresters, as a group, is tricky. They have their perspective on what works, at least for them, and it is my experience that, heretofore, they have not been much interested in being persuaded otherwise. It doesn't seem to matter how much ammunition we have on our side, what discoveries or confirmations we make, or what we can clearly demonstrate to anyone with an open mind. If it were rocket science, or some esoteric subject in philosophy, it would be another matter, but we're talking about really basic trigonometry and the visually obvious geometry of different tree species growing in different habitats and what you have to do to get accurate dimensions. On their side, they have years of tradition and a whole academic-professional structure behind them, which produces a mindset. Ah yes, a mindset.

Essentially, they view the subject of tree measuring as their rice bowl, and as a consequence, they aren't

receptive to others horning in on their turf, albeit a self-proclaimed turf. Given their long ascendancy in the world of tree measuring for commercial purposes, I do understand how they must feel, but I maintain that developing the instrumentation and the methodology is largely an engineering endeavor. In truth, it should be a cooperative effort, but the forestry-engineering interface has been through the design of instruments such as hypsometers with the forestry profession specifying the measurement methodology. I knew one of the forestry side's key members who helped forge the design criteria. Thus we got the 3-point tangent method built into instruments like the Impulse and TruPulse hypsometers as 'THE' tree-measuring routine.

As you well know, for LTI instruments that feature it, the VD return of the missing line routine is a direct implementation of sine top-sine bottom, but it isn't seen as a tree-height measuring routine. I expect it will in the future, because LTI has begun to acknowledge the accuracy problems that result from blind application of the HT routine, and will likely move to increase their educational outreach. But, I predict that LTI is going to encounter institutionalized resistance and will have to find ways to thread the needle, since instrument sales are involved.

The above said, I still haven't given up on academics and the government professionals. And I am finding private consultants and foresters working for conservation groups open to what we have to share. They have a mountain of invaluable experience. We could make a heck of a team. This was demonstrated on Oct 12th. I had a very positive experience with attending foresters, and want to forge a real alliance.

In the back and forth, I don't want to lose sight of our progress.

Robert T. Leverett

[Redwood Needle Shedding](#)

by **Mark Collins** » Mon Oct 15, 2012 9:58 pm



Today I was hiking in one of my favorite redwood parks when I noticed what seemed to be an abnormal amount of orange coloring in the canopies of the trees. At first, I thought it might be cones, but with my binoculars, I could see that it was the needles. I wasn't sure if it was the particular lighting of the day, or if I was just noticing it for the first time, but many of the trees had the same coloring. Before, I assumed redwoods shed needles throughout the year. Now it seemed reasonable to believe that the trees were shedding needles in the fall the same way they seem to grow new ones in the spring.



After looking up a little more info online, it sounded like this was normal for the redwoods to do this in the fall, especially since the rainy season has not arrived yet.



Any thoughts?

[Re: Redwood Needle Shedding](#)

by **mdvaden** » Tue Oct 16, 2012 2:44 am

It's normal.

It would be more of a concern if they were not doing that.

Pines, for example, do the same thing. About this time of year, needles pop off a certain part of the branch. Shore pines hold like 2 years worth. You almost won't find a 3rd year or 4th year fascicle of needles on shore pine.

Another pine can hold foliage back 9 years worth. Then on the 10th or 11th year, that foliage sheds, leaving the stem bare.

It's a needle persistence thing. :-)

M. D. Vaden of Oregon

[Other Events Surrounding the October 12th Advanced Tree Measuring Workshop](#)

by **edfrank** » Sun Oct 14, 2012 1:04 pm

Here are some photos from the events of the past week that were posted to Facebook

Broad Brook, MA - October 11, 2012



A beautiful fall day in New England. With big tree hunter Bob Leverett. Giving a talk at Smith College tonight - Joan Maloof



A beautiful fall day in New England. With big tree hunter Bob Leverett. Giving a talk at Smith College tonight. - Joan Maloof

Mohawk Trail State Forest October 13, 2012



Dedication of Mohawk Trail State Park in Massachusetts into the Network today - tall trees and cool breezes - directions on web page - Joan Maloof

William Cullen Bryant Estate - Oct. 13, 2012



A glorious day in the Rivulet Forest, William Cullen Bryant Estate, the Hampshire County MA contribution to the Network. A naming ceremony for the Mary Byrd Davis pine.



Inspiring yesterday in William Cullen Bryant Forest, western Massachusetts, with family and friends from Old Growth Forest Network, Eastern Native Tree Society, and Trustees for Reservations. We dedicated a huge old White Pine to the late old-growth forest researcher Mary Byrd Davis, my mother. - John Davis

October 12th Advanced Tree Measuring Workshop

by **dbhguru** » Sat Oct 13, 2012 5:40 pm

NTS, The October 12th Advanced Tree Measuring Workshop was held yesterday at MTSF. It was successful. Twenty-seven people attended. We began in the Nature Center where we a nice fire warmed us as a cold drizzle continued outside. We had coffee and donuts to further lift our spirits.

DCR's Dave Miller and Tim Zelazo launched the event, and after the customary greetings turned the events over to yours truly. Participating Ents included, Dale Luthringer, Carl Harting, John Eichholz, Bart Bouricius, Joe Zorzin, Joan Maloof, and yours truly. Dale and Carl had traveled from PA to help me out. Joe filmed part of the event.

Besides, Joe, a number of other forestry professionals including my friends Michele Wilson and Rex Baker were present. I met Robert Kobelia for the first time. Robert is a forester who did contract work at Suuny's Pack Forest in the Adirondacks. Not surprisingly, Robert and I know lots of the same trees, and of course, the Grandmother tree. Small world. I was pleased that Tom Kass, a lumberjack acquaintance of mine attended. I hadn't seen Tom in several years. All the timber professionals seemed to get a lot out of the workshop. It was highly gratifying.

LTI had two representatives present, including the Director of North American Sales, Steve Colburn. Steve brought plenty of TruPulses and most attendees got to use one on one or more of the trees we measured. Steve also got word from his engineers on how to further use the click-over point of the TruPulses to get a result that is dead on. I'll have more to report on this in a future post, but the information was truly exciting. All the work paid off.

With the permission of DCR, Joan Maloof dedicated MTSF as a forest in her old growth forest network at the end of the Friday event. Joan, Dale, and Carl stayed with Monica and me. We had a great time.

A distinguished attendee was Dr. Chris Queen, former Dean of Continuing Education at Harvard University. Chris's wife Alice is a pianist friend and colleague of Monica's. Chris wanted to see the big trees, and from all appearances had a very good time. But then so did everyone else.

Dale, Carl, and Joan stayed at our home and we all had a great time. But the events did not end with Friday's workshop. This morning, we dedicate the William Cullen Bryant forest as another in Joan's network, courtesy of the Trustees of Reservations. We also dedicated one of the great Bryant pines in honor of Dr. Mary Byrd Davis. Husband Bob, son John, John's wife Denise and her son Justin were all present, as was Dr. Julie Richburg, Trustees ecologist. I hadn't seen John in years. It was a great reunion. John plans to join us in Durango next summer.

After the dedication, John Eichholz and Dale Luthringer re-measured Mary's pine. It is 11.6 feet in girth and 152.9 feet tall - a worthy tree. Then I asked John and Dale to re-measure the Bryant pine. Pre-season height by my measurements was 157.7 feet. It looked like the new height was going to be a little over 159 feet, but John kept circling the tree, and before it was all over, John and Dale had confirmed a top at 162.2 feet. That's really satisfying. The Bryant Pines take their place as only one of 8 (and possibly 9) sites in the Northeast with trees of any species confirmed by NTS to heights of 160 feet or more.

I'll have more to report, but I want to thank Dale, Carl, Joan, Bart, and John for their indispensable support. Oh yes, we re-measured Jake. Another confirmation of 171.0 feet. Got 171.0 twice and 172.0 once. I think I know where I went over on the 172.0, but about 171.3 is a distinct possibility. Now that I know how to get virtually dead on accuracy with the TP200, I'll be back there measuring Jake again.

Robert T. Leverett

[Re: October 12th Advanced Tree Measuring Workshop](#)

by **dbhguru** » Tue Oct 16, 2012 10:30 am

NTS, I just got a communication from Dale Luthringer who independently measured several trees for me over the weekend.

Here's a recap on some of the more noteworthy trees I measured:

MTSF

Jake Swamp 171ft-Bushnell, 171.3-Nikon 440

Frank Deconte 162.4-Bushnell

Tall hemlock 128.3-Bushnell, 129.1-Nikon 440

WCB Homestead

Mary Byrd-Davis 152.7-Eicholz, 153-Luthringer (152.9ft avg)

WCB 10.6ft CBH 162.3-Eicholz, 162.4-Luthringer (162.4ft avg)

Dale Luthringer

As you can see, Dale measured the Jake Swamp Pine as 171 feet using his Bushnell and 171.3 using his Nikon. Jake has now been independently measured by three Ents (Bob Leverett, Dale Luthringer, Ed Ritz), using 5 different lasers (Leverett 2, Luthringer 2, Ritz 1).

Robert T. Leverett

[Re: Big Tree hunter shares his findings...](#)

by **AndrewJoslin** » Mon Oct 15, 2012 12:55 pm

I really like the two willow oaks, It's the last photo in the set. Reminds me of Congaree, SC magnitude oaks. Would love to see a crown photo as well, looks like good potential for decent height as well as girth.

Thanks for posting.



Andrew Joslin

[Re: Big Tree hunter shares his findings...](#)

by **JohnnyDJersey** » Mon Oct 15, 2012 4:53 pm

Thanks guys. Congaree State Forest is on my short list of places to visit. The two willow oaks above are between 15 and 17ft CBH with almost no tapering.

They are located in one of only 4 old growth forest left in New Jersey called Saddlers Woods. Its about 25 acers of Old growth tulip poplar, willow oak, American beech ect right smack in the middle of a bustling large town, outside of Philadelphia. What I may do is post some of the pictures individually and put stories underneath them.

John Harvey

[Nice white ash found, NJ](#)

by **JohnnyDJersey** » Tue Oct 16, 2012 8:49 pm

18'1" CBH Aprox 120' tall

Saw this white ash tree in the woods as I drove by recently. As I left the woods a hunter stopped me and after I told him what I was doing he told me there was a tree twice as big in those same woods. Cant wait to go back and find it!

Location: Wood off of New rd, Clementon NJ



John Harvey

[Thumper Mountain Sunrise, MA](#)

by **michael gatonska** » Tue Oct 16, 2012 3:51 pm

On the morning of October 12th, I climbed up Thumper Mountain to capture the sunrise in sound. On the way up, at around 5:30 in the morning, I saw in the beam of my flashlight a very sporadic light drizzle, mixed with some visible snowflakes. At this point, I knew that the audio that I had hoped to capture would probably not come to fruition, since there was a 20% chance of rain in the forecast until 12 pm. Furthermore, upon reaching the top, I quickly realized that Route 2 was too close; the unrelenting noise of Ford, Chevy, Subaru, BMW & Company (not to forget the Fly the Friendly Skies Team) would quickly become a sustained pitch.



<https://www.youtube.com/watch?v=8qu3oJ7cIMM>

Still, I was able to record a few minutes; the video I took shows a brightening pinkish light, which eventually became a dark, burgundy red off in the east. Oddly enough, paired with the video is my captured audio which reveals a different weather situation on top of ol' Thumper - the pitter-patter sound of a light rainfall, since it was completely overcast overhead with the fall of drizzle and some light winds. Soon enough, by 6:30 or so, this would become a dense mist with a more committed rain. At precisely 7 a.m., the sounds of heavy construction equipment could be heard, probably from bridge and road work still being done Rt. 2. At this point, any further attempts to capture the sounds of nature on top of Thumper were abandoned.



Recording set-up on top of Thumper

Michael Gatonska

[Rounding rules for TP200 and TP360](#)

by dbhguru » Tue Oct 16, 2012 12:51 pm

NTS, Here is the text of an email from Steve Colburn, Director of Sales for North America for LTI, sent to a number of Ents and affiliates.

Hello Bob, et.al.!

Thanks as always for putting our instruments to the test, Bob. There is nothing like an impartial keen eye to keep us on our toes! My delayed response to this message is due to the fact that I wanted to verify something with our (very busy) Engineering dept. It was to determine the formula used to round the numbers seen in the display of the TruPulse, after a precision distance measurement is completed. Here is the answer:

When units are set to Feet with the increments at 0.5', the unit rounds as follows:

10 = 9.75 to 10.24

10.5 = 10.25 to 10.74

11 = 10.75 to 11.24

When you confirmed with me, Bob, that you positioned yourself right at the changeover point with the higher number displayed, this would put you at the low side of the value, ~ 0.25' less than the display. If you factor this in to the data set attached, the numbers get even better with an average error of ~ 0.08' or about an inch!

This demonstrates that careful use of the instrument with proper procedure can yield very accurate results. We need to keep in mind, however, that most users won't practice quite the level of care as Bob does when measuring and they also will be shooting to more "uncertain" targets like leaves, twigs, candles, etc. At any rate, it sure is nice to see confirmation in the data that the process is working as planned!

Many thanks also for organizing the workshop at MTSF last Friday Bob, you did a great job as usual.

Walks through the woods measuring trees with you is quickly becoming one of my favorite activities!

*Warm regards,
Steve Colburn
Director of Sales, North America
Laser Technology, Inc.*

By taking the time, it is apparent that we can measure distances extremely accurately with the TruPulse line. From a spot of known distance, the angle can be measured independently to get our best determinations of height to date. Note that Steve says

This demonstrates that careful use of the instrument with proper procedure can yield very accurate results.

By proper procedure, Steve means the sine method where that method needs to be used. He has to be cautious about what he says for obvious reasons, but he understands what works and what doesn't. We are making rapid strides in getting the message across.

Robert T. Leverett

Re: Middleton Oak and Angel Oak

by **Neil** » Wed Oct 17, 2012 9:35 am

Hi Larry, Yeah, live oak grows so much faster than many folks suspect. Here is our past discussion on the topic:

http://www.nativetreesociety.org/fieldtrips/mississippi/liveoak_ages/live_oak_ages.htm

I do not have too much to add except that there is a new, more-rigorous, exploratory tree-ring analysis of live oak. You can download the paper here:

<http://web.utk.edu/~grissino/downloads/Bartens%20et%20al%202012.pdf>

Neil Pederson

Re: Middleton Oak and Angel Oak

by **bbeduhn** » Thu Oct 18, 2012 4:17 pm

I spent some time with both trees last week. My first acquaintance with the Middleton Oak was on the garden tour. I saw it from afar and thought that it couldn't be THE oak. It was, but not in its former glory. It had really lost an awful lot of volume. First, I'll list the missing trunks/limbs and then come the measurements.

These are approximations:

2' d 1.5' x 2.5' d 3' d 3.5' x 4.5' d 3.5' x 4' d

32'10" cbh No real growth since Eli measured it two years ago (32.81').

The brochure states a cbh of over 37 feet, with a height of 85 feet and a spread of 145'. I measured at 7' and 3' as well just for kicks and grins. The 37'+ figure claimed on the brochure must have been the max circumference at about 8' or so. I got 36'8" @ 7' and 33'0" @ 3'.

I got a spread of 126.75' For some reason, I forgot to get a height but I assume it hasn't changed much from Eli's 65.4'. The spread was 126' two years ago, so only a slight change.

I inquired about what was actually known about the tree and was told that it was a Native American trail marker when the first home was built in 1705.

However, many records were destroyed during the Civil War, so that is likely oral tradition. The lady who is best versed on the history of the gardens is in the hospital and is quite well on in age. apparently, she likes being the one in the know and hasn't shared everything that she knows with the other docents. If the story is true, it could place the tree in the 400 year range.

The Angel Oak looks to be in outstanding health. I got a height measurement of 62.9', a spread of 163.8' (a little shy of its true spread) and a cbh of 28'1". last year I got 28'0", showing one inch of growth. For spread, I measured 18 roughly even spaced spots about the tree. This is overkill but shows how it

plays out and many spots instead of just 4.
My spread figures not including the tree diameter:

105' 105' 102' 96' 84' 84' 82.5' 72' 69' 61.5'
61.5' 60' 51' 49.5' 52.5' 63' 91.5' 103.5'

These figures are simply what the laser showed, so they are a little shy of the true spread. I had a 2 year old and a 6 year old with me. They enjoyed following me around and playing with the instruments but I wasn't able to lay out tape to get a truly accurate spread length. Eli's 165' spread from two years ago may well have grown a bit. I got two other heights at the Angel Oak:

loblolly pine 94'
laurel oak 92.5'

The Angel Oak is named after the family who used to own the property. I have pictures of both oaks and will post them soon. I'll start a new thread about Middleton Place.

I found plenty more large live oaks as well. The most impressive was a 27.6' behemoth. It looked fairly young, likely 180-200 yrs. There's also a 31'8" but the two main trunks are connected at just 6' up. The larger trunk is 21'7". I got plenty of photos.

When you want to get together to talk about the website and look at photos?

Brian Beduhn

[More bad news...](#)

by **jamesrobertsmith** » Wed Oct 17, 2012 5:59 pm

If something doesn't happen to curtail the Earth's human population, most ecosystems are going to collapse very soon.

Madagascar palm trees at risk of extinction, study finds 17 October 2012

<http://www.bbc.co.uk/news/world-africa-19985536>

As we have been warned for decades now, we're bringing down the Sixth Extinction. And we're bringing it down on our own heads, but the people who notice are the ones shunted aside. My only consolation is that I know enough species will make it through so that diversification will once again take place and the planet will heal itself and be a grand place for life for another few billion years. Hopefully, nothing again will rise up to degrade the very ecosystems that support it. Intelligent life and technology? Overrated and a bane to the planet.



A pika I photographed on my way to Chasm Lake in Rocky Mountain National Park. They say it's going to be one of the first North American mammals to go extinct from the effects of human-caused global warming.

James Robert Smith