

DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By James and Thea Komen

The Case of the Perished Pine

We found out one day that the neighboring office was going to be renovated. It just so happened that we discovered this fact the moment they started renovating it. Codit had opened his laptop to work on a report when he was startled by the sound of a dull pounding on the other side of our office's wall. When he realized it was being caused by several hammers, he was sorely disappointed.

"What a pain the new neighbors are!" he complained, "I wish we had this building all to ourselves."

Though I didn't echo Codit's complaints, I did find the noise awfully distracting. I took a sip of coffee and tried to block it out. Thankfully, my ringing phone was able to cut through the racket. Putting a finger to my other ear, I answered to hear the voice of insurance adjuster Dean Johnson.

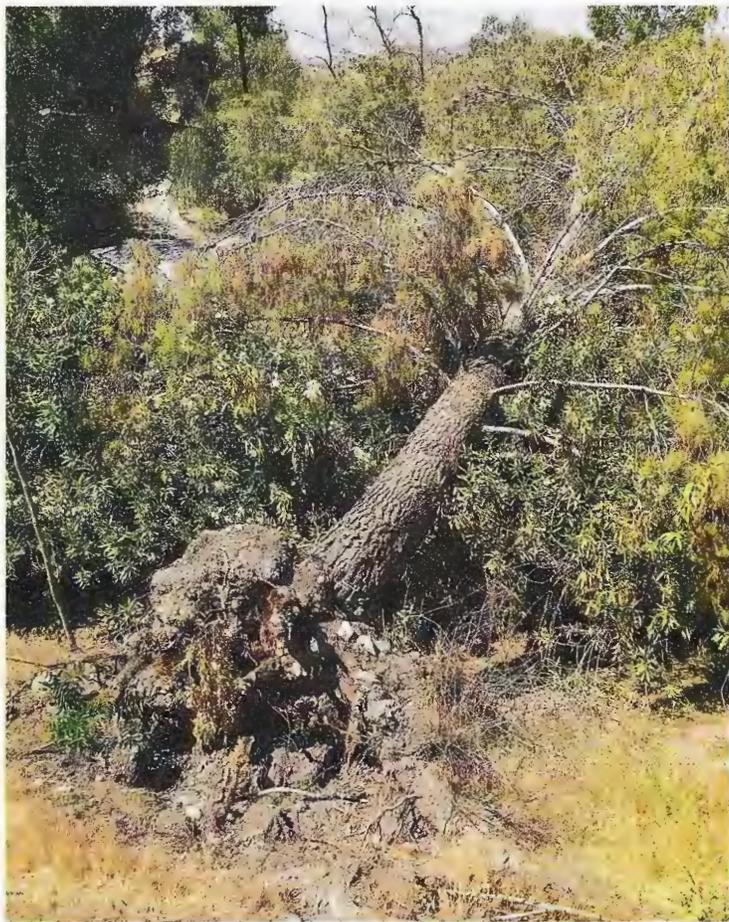
"Detective, we had a wind event yesterday with gusts up to 55 kph (35 mph), and a pine tree fell on our insured's house. Ordinarily I wouldn't have thought twice about the wind being the cause of loss, but I am a little doubtful this time because the wind speed in this storm was significantly lower than the 90 kph (55 mph) gusts that the area has experienced over the past couple years. I would like you to meet with Garrett, the owner, inspect his tree, and determine the reason it failed."

"You got it, Dean," I yelled into the phone over the cacophony of hammering. "We'll get on it today."

Knowing that evidence can spoil quickly, Codit and I grabbed some diagnostic tools and hopped into the truck immediately. It was crucial to get a good look at the tree before it was cleaned up. We were also happy to have an excuse to leave the harsh, discordant mixture of sounds at the office.

We drove to the outer fringe of the metro area past what seemed like endless acres of tract housing. Gradually the road shrank down to two lanes, and we began to see smaller ranch homes on equestrian property. A horse or two shook their tails at us as we drove by their barns. At last we turned onto a gravel road that twisted up through the contours of a canyon. Garrett's house seemed to be well off the beaten path.

As we made our way up over a pass and down into a bowl-shaped valley between the hills, Codit gestured to a dozen small cabins that dotted the basin. "Now this is the life, detective. Few neighbors and nothing for miles. Peace and quiet."



What caused this pine to fail in the windstorm?

Nearly the entire house was covered by the failed tree. The canopy was green and dense at the time of the failure.



From the top of the pass we could see Garrett's cabin nestled at the base of the eastern facing slope. It was hard to miss, as it was almost completely covered by the fallen pine tree. A few of the other nearby cabins had fallen into serious disrepair: paint peeled off the siding, windows were missing, and rust covered nearly every metal surface.

Outside of one of the better-looking cabins, a man was bucking up firewood. He set down his chainsaw and gave us a friendly wave as we drove by.

We pulled into Garrett's driveway to the crunching noise of our tires rolling over gravel. As I eased to a stop and turned off the engine, I was struck by the sudden silence. No freeway noise. No sounds of the city. Only a few birds chirping and the occasional chainsaw whirring from down the road. What a contrast to our deafening office!

Moments later there was some movement from inside the cabin. Garrett, an elderly gentleman in his eighties, came out, pushing aside a door that was barely hanging on to its hinges. He ducked under a large branch that had fallen across his porch and hobbled up to greet us.

"Detective Dendro, I presume?" he asked.

"Garrett, it's good to meet you," I replied.

Codit looked up at the damaged home with empathy. "I'm very sorry about your house, Garrett."

"My house?" Garrett said incredulously, "My house can be repaired. I'm sorry about my pine! Not only did that pine shade my home from the morning and early afternoon sun, but it was like a friend to me too."

I looked over at the tree. It was an Aleppo Pine (*Pinus halepensis*). Its foliage was still green and dense, indicating that it had been healthy immediately prior to the failure. The trunk had put a sizeable dent in the cabin, and I could see through a broken window that some of the scaffold branches had pierced the roof and invaded Garrett's living room. The cabin was one story with a flat roof and it looked to be no larger than about 60 square meters (650 square feet). The failed tree almost entirely covered it.

"I don't know how I'll manage this on my own," Garrett lamented, observing the mess. "One by one, all the neighbors I once knew have moved away." He gestured sadly at the empty, run-down cabins. "We used to help each other out, especially in tough times. There are only a few people that live up here now..."

"We'll take a good, long look at your old friend here and try to find out the reason he fell," I offered in consolation.

We began to inspect the tree by walking around the cabin towards the point of failure at the root crown. I could see that the branches on the eastern side of the tree were all fairly small. Most of the canopy had been projecting out of the western side of the main stem before it failed.

"Do you think the asymmetrical canopy was the reason for the tree's failure?" Codit asked.

"Maybe it was a contributing factor," I replied. "But that tree's been through a number of windstorms in prior years already. I wonder if something else was the catalyst..."

The failure had occurred at the root plate within half a meter (1.6 feet) of the trunk. Two broken root ends approximately 15 centimeters (6 inches) in diameter stuck out of the soil. While there was some minor discoloration, there didn't appear to be any substantial root rot present.

Codit poked around at the exposed root ends. "It looks like the root system is a little shallow here."

"That's to be expected from a tree growing on a rocky slope like this," I explained. "Steep slopes tend to have shallow soil, and therefore the trees that grow on them have shallow root systems. Most of the desirable topsoil erodes down the hill and ends up at the bottom. But just because a tree is growing on a slope doesn't necessarily mean it's unstable. Roots have ways of finding cracks in the geologic features below the soil and taking hold."

I then proceeded to inspect the trunk. Although failure had occurred at the root crown, perhaps there was some information to be gained by looking at other parts of the tree. I didn't see any entry or exit holes from engraver beetles (*Ips* spp.) along the trunk, further

supporting my assessment that the tree had been healthy prior to failure.

Engraver beetles were a known problem for the local trees. As secondary pests, they had been finishing off many of the pines in the area. Host pines were predisposed to attack because they had been stressed by drought and heat over the past few summers. But the subject tree didn't show any signs of engraver activity. Furthermore, engraver beetles have a negligible effect on the structural stability of the heartwood tissue in the short term because all their feeding takes place in the outer rings. While they might have caused a decline in the health of the canopy by cutting off the tree's water supply, it was unlikely that they could have been the ultimate cause of the tree's failure.

It looked like the tree had merely failed in the wind. But that simple explanation did not sit well with me. What was the catalyst? Why did it fail in *this* windstorm?

I took a step back from the tree to think. It was right then that I nearly tripped over the critical clue!

What did Detective Dendro stumble upon?

Turn to page 56 to find out!

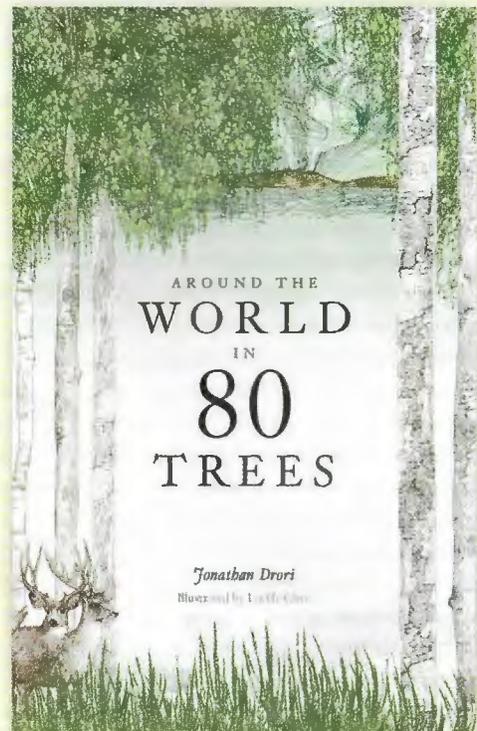
BOOK REVIEW

Drori, J. 2018. *Around the World in 80 Trees*. London, UK, Laurence King Publishing. 240 pp. ISBN: 978-1-78627-161-7.

Taking the moniker of a Jules Verne novel as a theme for tree travel is certainly an interesting concept. This book is a compendium of trees selected from countries in various parts of the world. The journey starts in Northern Europe (11 trees) and heads down to Southern Europe and North Africa (8 trees); then over onto the Eastern Mediterranean (5 trees); down to Africa (9 trees); Central and South Asia (8 trees); and then on to East Asia (4 trees); South East Asia (4 trees); Oceania (7 trees); South America (6 trees); Mexico, Central America, and the Caribbean (5 trees); and concludes in North America (13 trees).

Each entry is one or two pages long with illustrations. The narrative style works well, with a combination of historical references in literature, fun facts, and trivia. The wry undertone helps to add levity to the way in which civilization has utilized the various trees and adopted them for a wide array of purposes: timber, fruits, nuts, resin, and worship. Did you know that the apple originated on the slopes of Kazakhstan? Or that the mopane tree is host to mopane worm, a source of food? How about *sève bleue*, which has adapted to grow in nickel-rich soils in New Caledonia, or the jojoba in Western Mexico, which is used as a source of oil to lubricate machines? This is a well-written book, is fun to read, and is a great book to have to learn about a wide range of trees that may be familiar by name but not by source or cultural usage.

Julian Dunster, Victoria, British Columbia, Canada



WHAT'S THE SOLUTION?

Continued from page 28

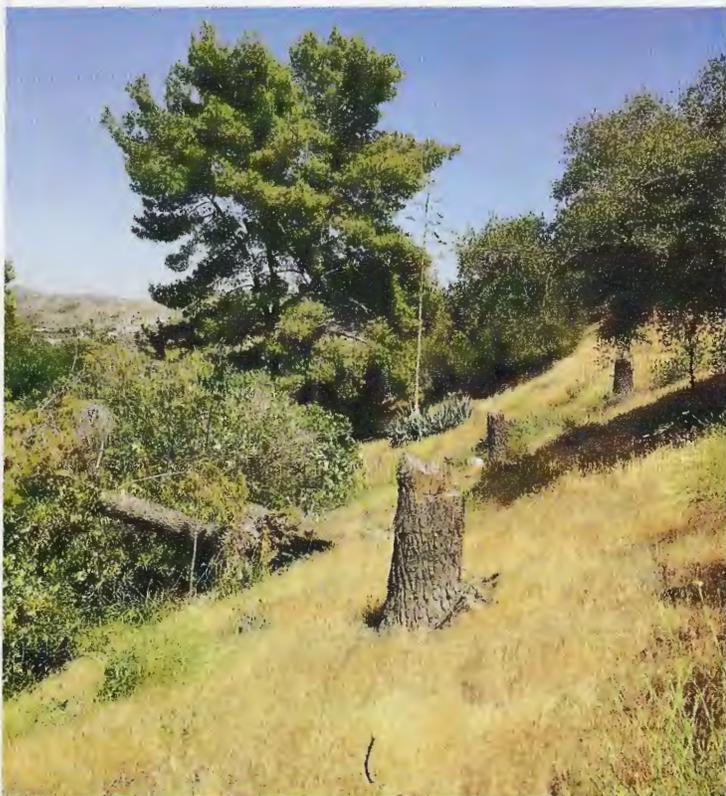


I caught myself and turned to look at the obstacle that had almost sent me sprawling. I had backed up into the stump of a former neighboring pine tree.

"Careful, detective!" Codit chuckled with a bit of schadenfreude. He seemed amused that for once it was me and not him being the clumsy one.

The stump was about 30 centimeters (12 inches) tall. Looking closer, I saw that it was riddled with entry and exit holes from the engraver beetle. The bark was loosely attached, but there were many galleries underneath. And interestingly, there was a small pile of thick shavings at the base of the stump tucked between some pieces of loose bark. These shavings were not the frass of the engraver beetle. I pointed them out to Codit.

"Those look like chainsaw shavings that got stuck between the heartwood and the loose bark, but they're not recent," he said, observing my discovery closely. "I would say that this tree was cut down about a year ago, and these shavings have been there since."



Neighboring trees were removed about a year prior to the subject tree's failure. The subject tree had been dependent upon them for the protection they provided from wind loading.

I realized immediately that this was the crucial piece of evidence. "Codit!" I exclaimed. "This is why our tree fell."

Codit looked at me quizzically as I headed back down the slope to the house. "Garrett! Can you tell me about the history of these other pines?"

"The neighboring pines had all been dying from the bark beetle," Garrett said. "It started when we had those last two years of drought and hot summers. Their canopies browned out last summer, so I had them cut down. It's such a shame. I used to have a nice grove around my home, but now I am much more exposed."

Garrett's story supported my theory. I picked up the narrative where he left off, explaining the solution to Codit, who had followed behind me. "That's exactly what happened to your tree. It had grown an asymmetrical canopy because of the neighbors. After its neighbors were removed, the wind loads applied to your tree increased. In only one year, your tree had too little time to deposit response growth to adapt to the new wind pattern. It failed in the most recent wind because it didn't have support from its neighbors."

I turned back to Garrett. "I'll document all of this in my report to your adjuster, Dean."

Garrett nodded. It was clear he was unsure of what to do while the insurance company processed his claim. He looked back with dismay at the tree lying on his home.

Not more than a moment later, we all heard footsteps coming up Garrett's gravel driveway. A new voice spoke up. "Hey there! Looks like quite a mess. Do you need a hand getting that tree off your roof?"

The man from down the road stepped forward and introduced himself. He had just moved in and hadn't had a chance to meet any of his neighbors yet. He held up his chainsaw and offered to buck up the fallen tree for Garrett. "Happy to help a neighbor!"

As Codit and I pulled away in our truck, Garrett watched with a grateful smile on his face as his new neighbor carefully dismantled the fallen pine.

"So what did we learn today?" I asked Codit,

Codit turned and looked out the back window at the shrinking scene of hospitality. "I guess that sometimes trees—like people—can use a little support from their neighbors."

James Komen is a consulting arborist in the greater Los Angeles area and owner of Class One Arboriculture. He specializes in risk assessment and tree appraisal. His wife, Thea Komen, is an arborist trainee with the company as well. Photos are courtesy of the author.

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