THE GLOBE AND MAIL

September 21, 2016

NRC trees thought to be descendants of Newton's apple tree may be imposters

By IVAN SEMENIUK

Trees thought to be descendants of the one that led to Newton's universal law of gravity may actually be imposters

For years, a pair of apple trees that stand on the grounds of the National Research Council's sprawling headquarters outside downtown Ottawa have been considered descendants of the tree that famously led Isaac Newton to come up with his universal law of gravity.

Now, some scientific sleuthing has thrown shade on that pedigree by revealing that the Ottawa trees may be imposters.

"I felt like I opened a can of worms and it was my obligation to follow it through," said Dick Bourgeois-Doyle, who inadvertently exposed the historic faux pommes while working on a book project celebrating the organization's centennial.

Mr. Bourgeois-Doyle who is the NRC's secretary-general, joked that his discovery is akin to "killing Bambi's mother." He then added: "That's not too much of an exaggeration." But while the revelation has dealt a blow to a cherished piece of institutional lore, it has also prompted one Canadian scientist to rush to the rescue with a genuine descendant of the illustrious Newton tree.

The episode began earlier this year when Mr. Bourgeois-Doyle had the idea of including a seed from one of the NRC apple trees in each copy of a limited-edition book about the organization's 100-year history.

Getting seeds was no problem – the NRC trees produce a healthy supply. But to explain exactly how the NRC trees are connected to Newton, he had to familiarize himself with their story, an exercise that soon had him searching through old records and piecing together remembered accounts by retired staff.

"You get into it and it becomes like a game," Mr. Bourgeois-Doyle said.

The story of the famous apple tree dates back to 1666 when Newton, then 23, spent several months at Woolsthorpe Manor, his family's countryside home in Lincolnshire, England, while Cambridge University was closed by the Great Plague of that year. For Newton, it was a remarkably fruitful period of mathematical insights, not the least of which was triggered – as he later recounted to others – by an apple he saw falling one day while in the garden.

The apple did not bonk him on the head as is sometimes depicted. However, it did get him thinking about gravity, the force that pulled the apple down. If gravity could extend from the Earth to the treetops, Newton reasoned, then why not as far as the moon? It was the crucial intellectual leap that allowed him to understand and then mathematically describe how gravity must obey the same relationship between mass and distance everywhere in the solar system.

Skeptics have dismissed the story as an embellishment on Newton's part but that did not stop devotees from preserving cuttings from an apple tree – a rare variety known as "Flower of Kent" – that was said to be the one Newton was referring to, and that continued to grow on at Woolsthorpe Manor long after Newton's day.

Fast forward to 1961, when the president of the NRC, Edgar Steacie was offered a scion of Newton's apple tree by the director of Britain's National Physical Laboratory, in exchange for a maple tree from Canada. The official letter, now in the NRC's archives, includes a handwritten note: "I do hope you are quite better again."

Dr. Steacie, a prominent figure in the NRC's history, died of cancer the following year. But a small apple tree, supplied by Kew Gardens, was planted in front of what was then the NRC's physics building and which still houses the atomic clocks that are used to generate the NRC time signal.

In the 1990s, the gift tree began to wither. Before it died cuttings were taken and, with the help of Agriculture Canada, grafted onto fresh root stock. Two small trees were later replanted in the spot where the original gift tree had stood. Mr. Bourgeois-Doyle said he has not found any evidence to suggest this was not done properly, but he wanted to be sure.

Today, a well-documented relative of the original Newton tree resides at the East Malling Research Station in Kent, England. The East Malling specimen is known to be derived from a cutting taken after the original tree at Woolsthorpe Manor was damaged in a storm in 1816.

The facility also offers a DNA analysis service to help identify unknown plant varieties. While still chasing down the details of the NRC trees, Mr. Bourgeois-Doyle sent a dozen leaves to East Malling to obtain an independent check on their ancestry. In July, the answer came back: Not only do the NRC's trees not match up genetically with Newton's tree at East Malling, they appear not to match up with each other.

"It's very clear that they're not related," said Edward Dobbs, a molecular biologist who oversaw the testing. "There has to have been a mix-up at some stage."

Exactly how and where the mix-up arose is unclear. Since the gift tree from 1961 is gone, its DNA cannot be checked or its heritage independently verified.

Now, Mr. Bourgeois-Doyle faced an awkward problem. Having unexpectedly felled the NRC's Newton connection, could he recreate it?

He soon learned of the only known example of an East Malling-line Newton apple tree on public property in Canada. It was planted at York University in 1999 and is still growing today on the university's main campus in Toronto.

Hoping to find out more, he contacted the university. The inquiry worked its way to Marshall McCall, chairman of York's physics department, who told him that the not only did York have a tree, but that his wife, a physicist and amateur gardener, had managed to cultivate two seedlings from it.

By chance, a few years ago, science historian Richard Jarrell had encouraged Susan McCall to try to grow a Newton apple tree from seeds gathered from the York specimen. In the end, two of the sprouted seedlings survived and she expected to give them to Dr. Jarrell. But the historian's death in 2013 put the plan on hold and so she planted them in her yard.

"I always wanted to donate them but I didn't know who to donate them to," she said.

When she heard about the NRC's dilemma, she immediately offered to give Mr. Bourgeois-Doyle one of trees, citing all the ways that the organization had been crucial to her career, starting when she was a summer student at the Ottawa facility.

"Everyday you'd walk outside and be greeted by these apple trees and you'd feel like you'd died and gone to science heaven," Dr. McCall said of her time there.

Last month, she rented a jeep and drove one of her Newton tree seedlings, now a 1.5-metre-tall tree, to Ottawa where it was planted in front of the two existing trees.

A delighted Mr. Bourgeois-Doyle said that the new tree will be dedicated to Dr. Jarrell who, fittingly, helped chronicle the NRC.

For Dr. McCall, who once did technical work related to the construction of LIGO, the gravitational wave experiment that made headlines earlier this year, it seems equally fitting that the late historian's influence helped her restore the NRC's symbolic link to the roots of gravitational science.

"There are so many connections," she said. "I don't think you could make up a story like this if you tried."