BOOKS & ARTS

The twentieth century in a nutshell

A sad and salutary tale of success, commerce, hubris, razzmatazz and scientific heroism.

American Chestnut: The Life, Death, and Rebirth of a Perfect Tree
by Susan Freinkel
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Prominent among the many riches that successive waves of human beings discovered in North America was *Castanea dentata*, the American chestnut. This tree could be relied on to produce an enormous crop of edible nuts every year, unlike the oak and beech. It was also huge — more than 5 metres in diameter — and, although not as strong as oak or as pretty as walnut, it supplied timber for anything from telegraph poles to coffins and even, at a pinch, for pianos. The tannin in the wood stopped it rotting or could be extracted to treat leather, leaving fibre for making paper.

The American chestnut grew abundantly. It was said that a squirrel could jump from chestnut to chestnut without touching the ground, all the way from Georgia to Maine. And, as Susan Freinkel remarks in *American Chestnut*, it "would pass over 1,094 places along the way with 'chestnut' in their names". In the Appalachian mountains, the tree's main stronghold, it supported an entire economy and culture. People ate the nuts and let their pigs and cattle loose to feed on them. They sent trains full of nuts and timber to the eastern cities. Ten million wild turkeys gorged on the Appalachian chestnuts. And the trees supported the now-extinct passenger pigeon — so numerous in the late nineteenth century that single flocks took several hours to pass overhead.

Unfortunately, European Americans from the early nineteenth century onwards have tried to improve on the native chestnut. They introduced other species of *Castanea* that had bigger and fleshier nuts. Former US President Thomas Jefferson favoured the European species; others went for Asian types. And with the Asian trees came the blight. These trees were resistant, but the American species was not. The fungus was originally identified as the genus *Cytospora*, then reascribed to *Diaporthe*, then to *Endothia*. In 1978 it wound up in *Cryphonectria*, where it remains as *Cryphonectria parasitica*.

The first signs of disease appeared in 1904 in what is now the Bronx Zoo: dying leaves, then canker, then death. The Bordeaux fungicide mixture that had worked so well in French vineyards was of no use. By 1908 the disease was out of hand, and by 1911 it had spread to more than ten states. One of these, Pennsylvania, created a 'firewall' by destroying all of its chestnuts in an unsuccessful attempt to contain the disease, spending $275,000 (about $5 million in today's money) and inflicting much misery. They may even have signed the American chestnut's death warrant by wiping out those trees that might have founded a resistant generation. By the end of the 1920s, the wild trees had all but gone.

The American chestnut was wiped out by fungus.

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Ever since, various enthusiasts and professional institutions have been trying to stage a chestnut come-back by means of three strategies. One is conventional breeding — crossing native American and resistant Asian trees to combine the best of both, or backcrossing resistant hybrids with pure Americans to produce second-generation hybrids that are 75% American and 25% Asian, hoping that the Asian contribution includes the genes for resistance. Hypovirulence is another approach, infecting the blight fungus with a virus (discovered by chance in Italy) that greatly reduces its vigour, so that even American trees recover from its attacks. Blight-ridden American trees have been saved by infecting the active fungus with virus-ridden fungus. The third approach is to use genetic engineering to introduce genes for blight resistance — including synthetic ones. This is difficult because chestnuts — in contrast to, say, poplars — grow poorly in culture. Like the giant panda, these trees seemingly resist the efforts of conservationists.

The story of the American chestnut encapsulates the history of the twentieth century. We began the century with a tree that could do everything, and all we had to do was to treat it with respect. Instead, the entrepreneurs undertook an exercise in hubris, trying to improve on the unimprovable with sublime disregard for the complexity of nature. Then came the political razzmatazz: much posturing and rhetoric, and significant consignments of public money — all well intended but, in the end, horribly misguided. It would have been better to have done nothing (which is difficult for politicians). Then there have been decades of scientific enterprise by heroic individuals, some of whom sacrificed careers and income for chestnut breeding.

The result? To celebrate Arbor Day in 2005, President George W. Bush planted a hybrid chestnut outside the White House that was 75% American; it may have enough resistance to fend off blight but probably not the genetic wherewithal to grow to American size. The president told us that planting trees "is good for the economy and good for the environment". Latest reports indicate that the White House tree is not thriving.

American Chestnut is a parable for our time: a sad and salutary tale, beautifully told by US science journalist Susan Freinkel. Parables lend themselves to different interpretations. Freinkel says, "The American chestnut, successfully restored, would confirm that we have the power to make things right." A potentially dangerous conclusion, as only with large slices of luck do we get away with our excesses. The lesson to be learned from this majestic tree, I suggest, is that we should aim to leave well alone. ■

Colin Tudge is the author of *The Secret Life of Trees* and *Feeding People is Easy*.