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Richard Collins: General Sherman giant redwood tree is the largest member of its species alive

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WILLIAM TECUMSEH SHERMAN fought in the American Civil War. Fortunately, he was on the Union side. Otherwise, his memorial might now be toppled, which would be 'a shame'; the General Sherman giant redwood tree is the largest member of its species alive today.

It was suggested, originally, that the tree's genus be named after another military commander, the Irishman Arthur Wellesley. He died in 1852, a year before John Lindley provided the first scientific description of the tree he called *Wellingtonia giganteum* in honour of the Iron Duke. Unknown to him, however, there was already a *Wellingtonia* genus, so the name of an outstanding Cherokee scholar was used instead; Sequoyah had created a writing system for his native language. Thanks to him, the literacy rate of his people soon surpassed that of the European 'settlers' who invaded their lands.

Nothing quite prepares you for an encounter with the redwoods of the American West; you are Gulliver in the Land of the Giants. Their vital statistics are mind-boggling. The Crannell Giant, felled by loggers in Humboldt County in 1926, was 20% heavier than the General Sherman. Hyperion, in Sequoia National Park, is just 4m shorter than Dublin's Millennium Spire, while Muir Snag in Converse Grove is about 3,500 years old. What gales thunderstorms and fires must these veterans have endured during their long lives?

Wellingtonias were planted in Irish parklands in the late 19th Century. Incongruously for such a mighty tree, the bark is soft warm and gentle to the touch. It is beloved of the little mouse-like tree-creepers which nest in it and use its warm cavities as snug roosting sites in winter.

Bark is the tree equivalent of our skin. The authors of a paper, just published, write that the *Wellingtonia's* bark 'fulfils a multitude of different physiological and ecological functions'. It transports and stores resources the tree needs and has a protective role, offering chemical-warfare defences against potential invaders. The bark of most tree species is just a few cell-layers deep, but the giant sequoia's is thick and cork-like, resembling polystyrene. The *Wellingtonia*, the University of Freiburg scientists say, possesses a bark 'with outstanding insulation capability'. Serving as a blanket, it protects the tree from lethal forest fires ignited by lightening strikes. If the temperature beneath its bark were to exceed 60°C, a tree would die.

That redwood bark offers fire-protection has long been known, but the Freiburg team discovered other benefits it confers. Scientists, writing in 2002, claimed that 'the Sierra Nevada has undergone large prehistoric and historical rockfalls and rockslides... triggered either by strong seismic shaking or

long periods of unusually wet weather'. The landslides generated by earthquakes close to the notorious San Andreas fault pose a particular threat to redwoods.

Being able to survive rock-fall impacts requires unique adaptations. The giant sequoia's bark structure consists of hollow fibre bundles and air cavities. These, the Freiburg team found, cushion the impacts of falling rocks, absorbing and distributing their kinetic energy. They are more effective than armour-plating. The most famous American tank of World War II was the 'Sherman', another armour-plated monster.

Georg Bold et al. The protective role of bark and bark fibres on the giant sequoias during high-energy impacts. International Journal of Molecular Sciences. 2020.

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