

Lycopod fossils indicate hollow root structure

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Lycopod fossils collected from Western Pennsylvania, USA demonstrate an anatomical structure which supports the idea that the roots were hollow prior to being buried and fossilised.

In the article 'Carboniferous Floating Forest',¹ Joachim Scheven presented evidence that Lycopod² trees and their roots were hollow. This strongly indicates that the roots had grown while suspended in fluid rather than having been anchored in soil. Scheven postulated that Lycopod trees could have grown as unique forest 'rafts' floating on water.

If the roots (called *stigmariae*) were indeed hollow, one would expect the pressure of the overlying sediments to have flattened them before they were fossilised. Being surrounded by sediment, the hollow roots would have been prevented from expanding sideways. Therefore flattening would have produced a longitudinal crease running along the top of the root.

I have collected specimens of fossilised Lycopod roots from a site near the western border of Pennsylvania, USA, and examined these to determine whether the roots were hollow or solid. Altogether some 31 specimens of these Lycopod roots were collected, and 29 of them had been flattened. Of these, 17 had a longitudinal crease running along the root. A typical example of a flattened specimen is shown in Figure 1. The presence of creases



Figure 1. Portion of a fossilised Lycopod root (*stigmaria*) that has been flattened causing a longitudinal crease along the middle.

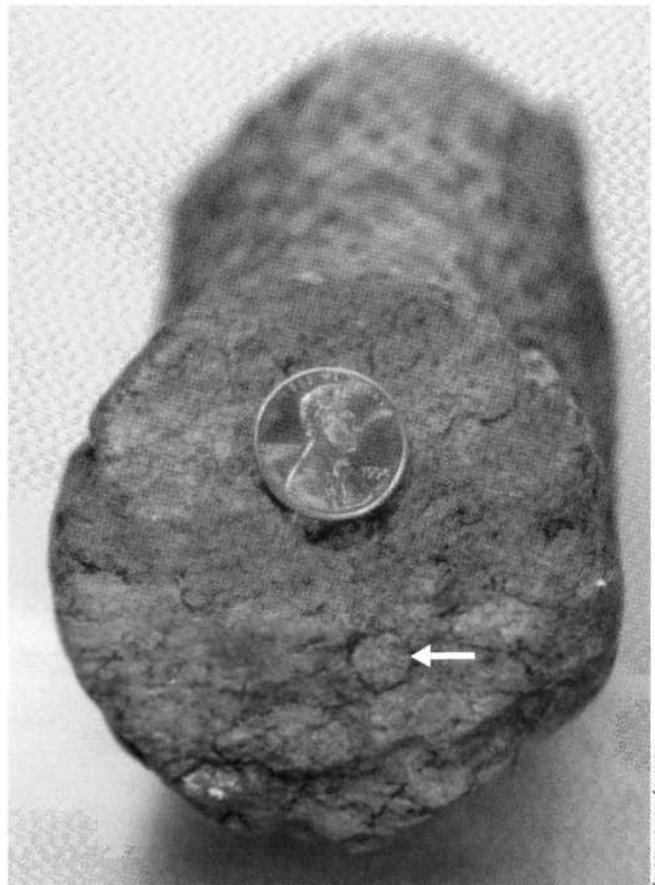


Photo by Daniel Woolley

Figure 2. The fossilised Lycopod root has remained circular because it was filled with sediment. The one cent coin illustrates the size. The small cylindrical core (*stela*) is seen off-centre toward the bottom of the root (arrow).

on these flattened roots supports the idea that the roots were hollow when they were buried.

On the other hand, if the roots had been solid, one would expect that they would retain their shape after they were buried and that the central cylindrical core would be confined to the geometrical centre of the root. However, of all 19 specimens which had observable cores (called *stelae*), only two had these cores still in the centre of the fossil. Many of the specimens had the core lying near the periphery of the root as illustrated in Figures 2 and 3. This is consistent with the roots having been hollow and inconsistent with the idea of solid roots. The off-centre core supports the idea that the hollow root interior was filled with sediment, at or around the time of burial, preventing the root from being flattened.

In a number of cases a thin carbonaceous layer surrounded the fossil roots as shown in Figure 4. The presence of this carbonaceous layer suggests that the originally hollow interior was filled with sediment before being buried. Subsequently the actual plant matter surrounding the sediment had been carbonised.

All of these modes of preservation speak of the same anatomical structure: a big lumen between cortex and

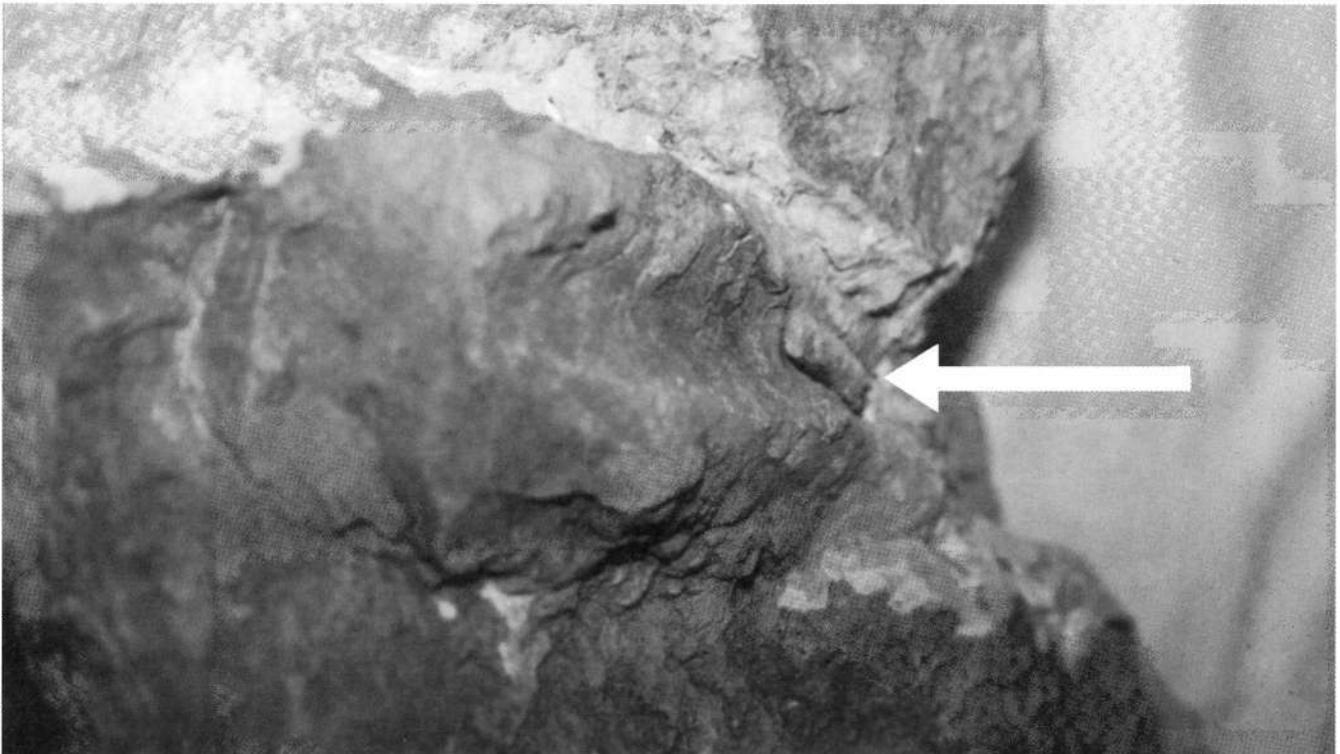


Photo by Daniel Woolley

Figure 3. The circular Lycopod root has the small cylindrical vascular core (stele) off-centre to the right (arrow) where portion of the fossil has broken away.

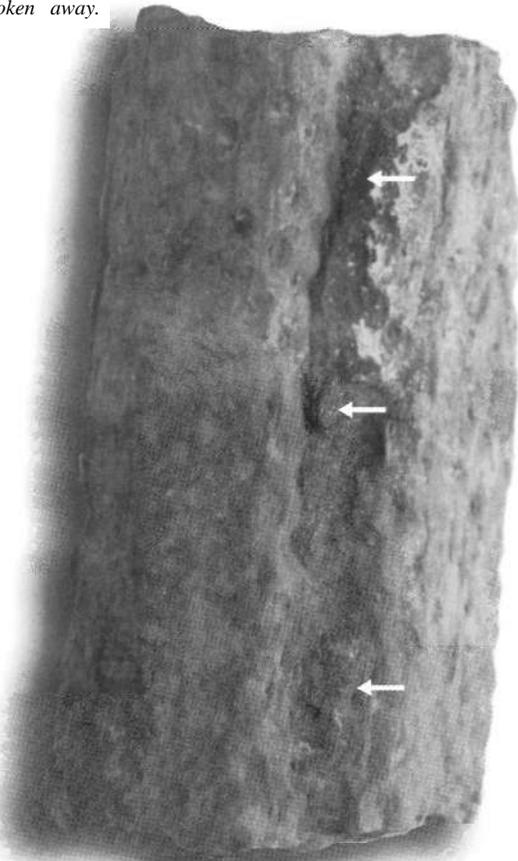


Photo by Daniel Woolley

Figure 4. The black sent in the longitudinal crease (arrows) indicates that the original vegetative material has been transformed to carbon.

central vascular cylinder (probably air-filled) which was merely permeated by the vascular bundles from the 'wood' to the appendices on the outside. My observations of these fossils therefore add support to Scheven's conclusion that Lycopod roots were hollow prior to being buried and fossilised.

References

1. Scheven, J., The Carboniferous floating forest — An extinct pre-Flood ecosystem. *CEN Tech. J.* 10(1):70-81, 1996. See also Wieland, C, Forests that grew on water, *Creation* 18(1):20-24, 1996.
2. Lycopod is the common name for plants assigned to the division Lycophyta. In the extensive coal deposits of the Carboniferous system, the trees of this division were the largest and most abundant.

Daniel A. Woolley is a sixteen-year-old student of science from Rhode Island, USA, and an avid reader of creation science material. Not content with theoretical studies and second-hand information, Daniel prefers to go to the field himself to check the evidence first hand.
