Let $L/\mathbb{Q}$ be a Galois extension with group $D_3$. Then $L/\mathbb{Q}$ admits a canonical non-classical Hopf Galois structure with Hopf algebra $H_{\lambda}$. By a theorem of C. Greither, $H_{\lambda} \cong \mathbb{Q}[D_3]$ as $\mathbb{Q}$-algebras. In this paper we show that up to scalar multiplication, nilpotent elements in $H_{\lambda}$ correspond to rational points on a certain conic over $\mathbb{Q}$. Using this result we give a new proof of Greither’s theorem. This is joint work with A. Koch, T. Kohl and P. J. Truman. (Received January 29, 2019)