1023-E5-907 **Gareth E Roberts*** (groberts@radius.holycross.edu), Dept. of Mathematics and CS, College of the Holy Cross, 1 College Street, Worcester, MA 01610, and **Trevor M O'Brien**. *An Amazing Bifurcation Diagram Arising from Newton's Method.*

Newton's method applied to a complex polynomial can fail quite miserably, even on a fairly large open set of initial guesses. We investigate Newton's method applied to the quartic family $p_\lambda(z) = (z+1)(z-1)(z-\lambda)(z-\bar{\lambda})$ where $\lambda \in \mathbb{C}$ is a parameter. The symmetric location of the roots allows for some easy reductions. Classifying those $\lambda$-values where the method fails on an open set leads to a complicated yet marvelous picture in the $\lambda$-parameter plane full of Mandelbrot-like sets, tricorns and swallowtails. (Received September 22, 2006)