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**Oleg V. Borodin, Alexandr V. Kostochka, Bernard Bernard Lidický\***  
(lidicky@illinois.edu) and **Matthew Yancey**. *Short proofs of coloring theorems on planar graphs.*

A recent lower bound on the number of edges in a  $k$ -critical  $n$ -vertex graph by Kostochka and Yancey yields a half-page proof of the celebrated Grötzsch Theorem that every planar triangle-free graph is 3-colorable. In this talk we use the same bound to give short proofs of other known theorems on 3-coloring of planar graphs, among whose is the Grünbaum-Aksenov Theorem that every planar with at most three triangles is 3-colorable. We also prove the new result that every graph obtained from a triangle-free planar graph by adding a vertex of degree at most four is 3-colorable. (Received December 03, 2012)