1106-VN-573 **A. V. Kostochka** and **B. M. Reiniger*** (reinige1@illinois.edu). *The minimum number of edges in a 4-critical graph that is bipartite plus 3 edges.*

Rödl and Tuza proved that sufficiently large $(k+1)$-critical graphs cannot be made bipartite by deleting fewer than $\binom{k}{2}$ edges, and that this is sharp. Chen, Erdős, Gyárfás, and Schelp constructed infinitely many 4-critical graphs obtained from bipartite graphs by adding a matching of size 3 (and called them $(B+3)$-graphs). They conjectured that every $n$-vertex $(B+3)$-graph has much more than $5n/3$ edges, presented $(B+3)$-graphs with $2n-3$ edges, and suggested that perhaps $2n$ is the asymptotically best lower bound. We prove that indeed every $(B+3)$-graph has at least $2n-3$ edges. Our proof uses a potential function and the connection between orientations and colorings of graphs.

If time permits, I will also present a problem which arose as a possible way to simplify our proofs. This work is ongoing and joint also with Alon, West, and Zhu. (Received September 02, 2014)