1007-52-194 **Aaron D. Trout*** (`aaron_trout2000@yahoo.com`), Math Department–MS 136, Rice University, 6100 S. Main St., Houston, TX 77005-1892. *A Rigid Combinatorial Sphere Theorem.*

We present two results in "combinatorial differential geometry". 1) Any combinatorial 3-manifold whose edges have degree at most five has edge-diameter at most five. In higher dimensions, a combinatorial n-manifold whose $(n-2)$-simplices have degree at most four has edge-diameter at most two. The fact that these degree bounds imply compactness was first proved via analytic arguments in a 1973 paper by David Stone. Our proof is completely combinatorial and provides sharp bounds for the edge-diameter of the triangulation.

2) Suppose a combinatorial n-manifold M satisfies the hypotheses above and the edge-distance between the vertices $v, w \in M$ is maximum. Then, M is a combinatorial n-sphere. Moreover, the triangulation of M is entirely determined by $St(v)$. That is, if M' is another combinatorial n-manifold which satisfies our hypotheses and in which the vertices v', w' have maximum edge-distance then any simplicial isomorphism $St(v') \cong St(v)$ extends to a simplicial isomorphism $M' \cong M$. (Received February 21, 2005)