1070-20-133   **Richard M Green*** (`rmg@euclid.colorado.edu`), Department of Mathematics, University of Colorado at Boulder, Campus Box 395, Boulder, CO 80309-0395. *Polytopal subcomplexes and homology representations of Coxeter groups.*

Let v be a nonzero point in Euclidean space on which a finite Coxeter group W acts by reflections. The convex hull of the points $W.v$ is a geometrically and combinatorially interesting polytope on which W acts as automorphisms. Discrete Morse theory is a purely combinatorial theory that is useful for computing homology groups arising in combinatorial topology. I will discuss the problem of finding a complete acyclic Morse matching on the face lattices of these polytopes. Discrete Morse theory then tells us that the polytope has the homotopy type of a point, which we knew anyway because polytopes are contractible. The talk will explain how this seemingly useless construction can be used to understand certain homology representations of Coxeter groups. (Received February 06, 2011)